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HIGH PRESSURE LUBRICATION

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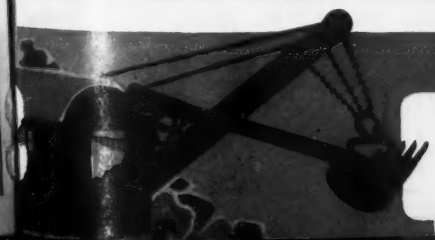
S-A Unit Carriers are now available with fittings for high pressure lubrication.

STEPHENS-ADAMSON
AURORA MFG. CO. ILLINOIS



June, 1924

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1910—Fourteen Years of Service—1924

Still handles 100 yards an hour

You want to know how much the crane you buy will handle as well as how much it costs. After all a crane's output, its years of dependable service and its resale value are what really determine its cost.

The Brownhoist shown below is a 20-ton crane and a duplicate of one recently sold to the Hunters Point Lumber Co. as a result of the good work done by their old crane.

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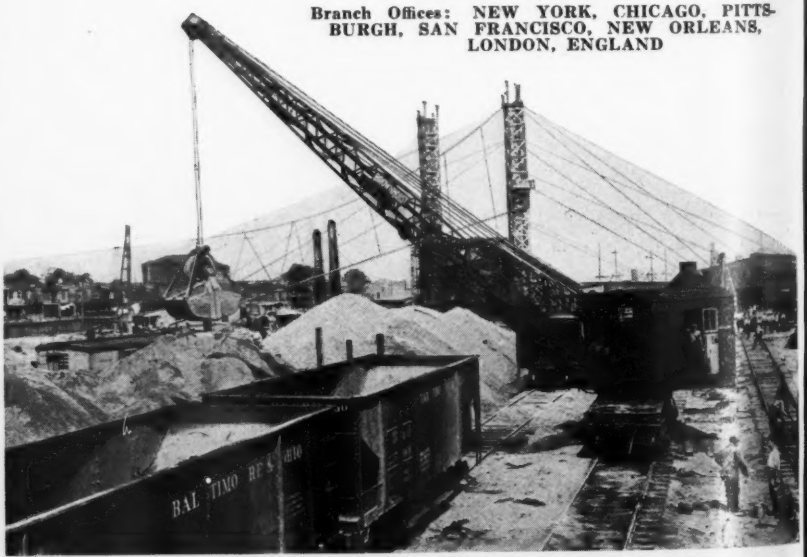
The Brown Hoisting Machinery Co.
Cleveland, Ohio

Branch Offices: NEW YORK, CHICAGO, PITTSBURGH, SAN FRANCISCO, NEW ORLEANS, LONDON, ENGLAND



BROWNHOIST

MATERIAL HANDLING MACHINER

Pit and Quarry

A Monthly Publication for Producers and Manufacturers of Sand, Gravel, Stone, Cement, Gypsum, Lime and Other Non-Metallic Minerals

VOL. 8 CHICAGO, ILL., JUNE, 1924 NO. 9

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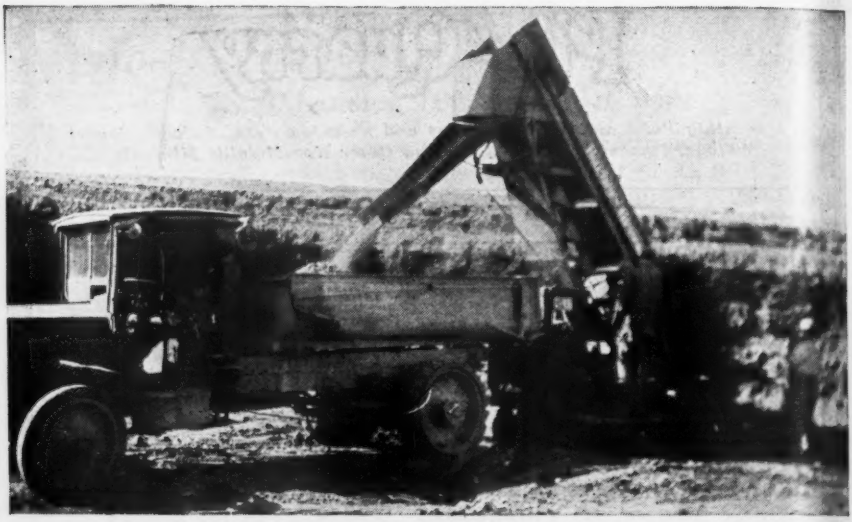

Trucks could not keep up with it

While graveling a California mountain road, Blumenkranz & Vernon found a natural wash with a good deposit of sand and gravel. However, the sand content was spotty, varying from 10 to 70%.

Instead of resorting to the usual traps, bucket elevators, screens, bunkers, etc., they used a Barber-Greene Bucket Loader.

An adjustable gate and a special screen with ⅜-inch mesh were used to keep the sand to the desired proportion at all times.

In this way, more than 300 yards of gravel were loaded into trucks each day, and at least 100 yards of sand screened to one side.

The Barber-Greene was never worked to capacity, for the trucks could not keep up with it.

In Vancouver, B. C., a Barber-Greene Type-U Conveyor worked at a pit face only 5 feet deep. Yet in one year it saved its owner an amount equal to 50% of the previous year's entire loading cost.

Barber-Greene loading methods will not only bring a new speed and efficiency to your pit work; they can also save you a considerable part of the money you are now spending for this work. Our Catalog N will give you interesting and important loading data. Send for it now.

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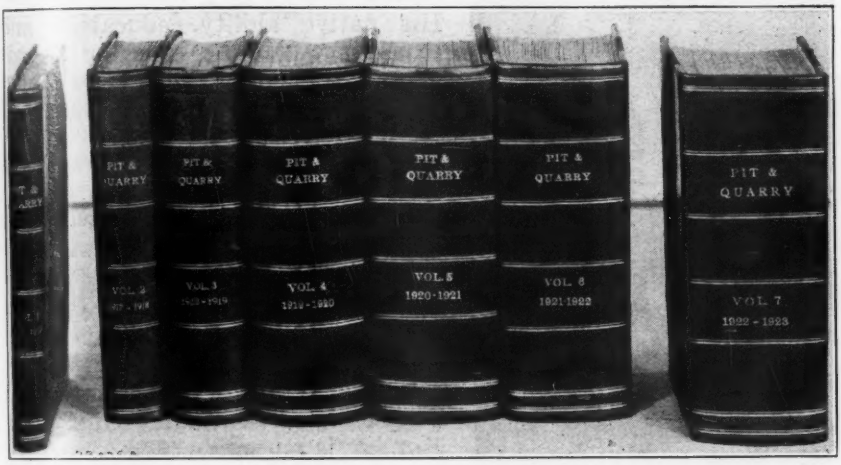
Portable Belt Conveyors · Automatic Ditch Diggers · Self Feeding Bucket Loaders

Pit and Quarry

Vol. 8 Chicago, Ill., JUNE, 1924 No. 8



Pit & Quarry to Be Published Semi-Monthly

THE DEVELOPMENT and growth of the non-metallic mineral industries has been consistently paralleled in the growth of PIT and QUARRY.

First published six times a year, back in 1917, it eventually became necessary to publish monthly in order that the news and enterprise of this field might be adequately reported and described. Since monthly publication began there has been a consistent growth of the paper, which has corresponded to industrial expansion.

But the time has come when monthly publication no longer serves, as effectively as should be, the needs of these great industries. Therefore, the publishers of PIT and QUARRY desire to announce a change in the frequency of publication, to begin in the near future.

The sand, gravel, stone, cement, gypsum, lime and other non-metallic industries are growing to such magnitude and importance in the economic life of the country and developments in the science and news of these industries are so rapid and continuous, as to impose upon a publication devoted to them increasing responsibility for adequate reportorial and editorial service.

In accommodation of these conditions, and of an extended, broader editorial policy, PIT and QUARRY will soon be published semi-monthly (on the 1st and 15th day of each month), for the constructive service and pleasure of our esteemed readers.

Mr. Harold Walker Munday Succeeds to Editorship

Harold W. Munday

As associate editor of PIT and QUARRY and Pit and Quarry HAND BOOK, Mr. Munday exhibited fine ability as a technical editor. His native ability, education and experience will be reflected in his administration of the editorial department. With a keen sense of the practical, he will, we hope, affectively serve the interests of our esteemed readers in directions indicated by close contact with the activities in the Pit and Quarry field.

Mr. Munday was educated at Purdue University and Armour Institute of Technology where he received his degree of Bachelor of Science in Civil Engineering. Mr. Munday is an active member of the Western Society of Engineers, American Institute of Mining and Metallugical Engineers, Society of Industrial Engineers and American Association of Engineers and Triangle.

V. E. LARSEN,
Manager.

Losses in Buying

One of the most unnecessary and easily avoided causes of loss in business is imprudent buying. Imprudent buying results from failure to understand fundamental economic conditions or lack of knowledge of the needs of a business. A wise executive avoids buying when the market is high and selling when it is low. He tries not to carry too large an inventory. He tries not to make the fatal mistake of overbuying equipment and supplies. To tie up working capital in excessive inventory, equipment or supplies is to create a situation most difficult to undo. Speculation is dangerous and should be avoided.

Sources of supply should be studied carefully before buying to prevent loss. Dealing with middlemen is costly; dealing directly, economical. Depending entirely on one source of supply may result in loss. Buying from alternative sources renders the buyer more independent and safeguards his interests.

U. S. Gypsum Company Expands Its Lime Plant at Genoa, Ohio

Fourth Construction-Program at Eight-Year-Old Property to Be Completed July 1, with 40 Kilns in Operation and Daily Capacity of 500 Tons of Lime.

THE UNITED STATES Gypsum Company since 1915 has owned an important lime property at Genoa, Ohio. The plant went into operation in 1916 and during the next seven years was enlarged three times to meet the demand for its products. Since January 1, this year, the fourth material expansion has been under way. This construction will be completed by July 1 and will make the establishment one of the largest lime producers in the Northwestern Ohio field, with 40 kilns in operation and a daily production capacity of 500 tons of hydrate.

Genoa, Ohio, has been a lime-producing point for more than 50 years. The purity of the outcropping stone in this deposit was recognized by the agricultural settlers. They burned it in a crude way; slowly the comparatively good quality of their product created a more than local demand, which resulted in gradual abandonment of the rude kilns and the substitution of more extensive plants with facilities for modern and large-scale processing.

Character of Raw Material

The United States Gypsum Company property is located on the upper beds of the Niagara Lime. This deposit is widely distributed in Western and Northwestern Ohio. It is of great thickness, but the upper beds, which are composed of the true dolomite limestone, are the ones which possess the peculiar properties of purity and structure which make possible the production of a white, cool-working hydrated lime of exceptional quality.

In 1914, before beginning construction of its plant, the Gypsum Company had a test hole put down in the middle of its property to the depth of 150 feet. By careful drilling, 98 per cent of the core of this hole was retained. Carefully sampled specimens of the core were submitted to Professor D. Hector Trowbridge of the Lewis Institute, Chicago, and his analyses produced the following average result:

Carbonate of lime	54.78 per cent
Carbonate of magnesia	45.07 per cent
Iron and aluminum oxides	.72 per cent
Silica	.26 per cent

"The above analyses show," Dr. Trowbridge's report proceeded, "that this rock should not be classed as a limestone, or even a dolomitic limestone, but that it is a true dolomite having a very small amount of impurities. An ideally pure dolomite would contain 45.7 per cent of magnesium carbonate. Extensive deposits of this rock are rare in this country, so far as I am able to learn, and it is to be noted how even the results run for the entire 149 feet."

It was this high quality of raw material, as well as the central location of the deposit, the low-cost quarrying conditions and the good transportation available, that determined the location of the Gypsum Company plant at Genoa.

Quarrying Conditions

The company owns 115 acres of land, a half-mile southeast of Genoa. The deposit at that point is known to be workable to a depth of 150 feet. Drilling to a depth of 225 feet shows the same rock present there, but core-tests have not been made to a greater depth than those used for the analyses of Dr. Trowbridge. Estimates place the amount of rock contained in this property at, roughly, 50,000,000 tons.

In many places on this tract, the rock is outcropping. At no point is the overburden so deep that it cannot be stripped by plows and hand-shoveled into wagons for removal.

At present, after eight years of ex-

*The first Schaffer Hydrator built was installed in this plant, and this hydrator is still working alongside the new modern type Schaffer just installed.

United States Gypsum Com

traction, the extent of the quarry is slightly more than one acre. It is operated in two benches. The face from surface to upper bench is 65 feet and to the lower bench, some 20 feet more. Little difficulty from water has been encountered though, of course, pumps are kept on hand.

Blast holes five inches in diameter are sunk from the surface by standard well-drilling apparatus. The holes are placed 12 feet behind the edge of the pit and 12 feet apart. Ingersoll-Rand air drills are used to make the "block holes" by means of which the rock, as blasted into the quarry, is reduced to one-man handling size.

The loading is done by hand. The Gypsum Company has experimented extensively with steam shovels, but has found that manual loading reduces the amount of fine rock not adaptable to the process of calcination. In consequence, the amount of road rock produced in this quarry has been kept down to 15 per cent of the total product.

The rock, loaded into narrow-gauge quarry-cars of ton-and-a-half capacity, is taken to the hoisting places by horse and is raised from the quarry to the kilns by means of gantry cranes. The gantry tracks run close to the edge of the pit and parallel to the line of 40 kilns. Until this year, two cranes were in operation, but a part of the 1924 construction, now just nearing completion, is the installation of a third gantry. One is devoted largely to the handling of coal; the other two, entirely to hoisting the rock, each having a capacity of 500 tons a day and each being able to load any one of the kilns.

In outline, the flow of the material from that point on is as follows: by crane into kiln; drawn and cooled,

Plant at Genoa, Ohio.

and conveyed as quicklime to a Williams hammer mill; thence to Berquist hoppers; thence to Schaeffer hydrators*; discharged into Raymond pulverizers; conveyed thence to the warehouse, where it is bagged and made ready for shipment.

Following this outline, the plant consisted, before the 1924 enlargements, of these essential units: 27 kilns; a cooling floor; one Williams mill; one hopper; one hydrator; two Raymond grinders, and a single warehouse with two Bates baggers.

Expansion of Plant

When, in 1915, the United States Gypsum Company first designed and built this mill, nine kilns were installed. Subsequently eight more were put in; then, five more; in 1923, five more, making 27 at the beginning of the present year. The production capacity at that time was 300 tons of hydrate a day. Thirteen additional, coal-fired, steam-injection, hand-draw, continuous kilns are part of the current expansion, making a total of 40 which will be in operation by July 1.

The new kilns are of practically the same dimensions as those used before. The Gypsum Company's experience has shown that larger kilns not only are less economical but also are less adaptable to turning out a product of standard quality. In consequence the only changes in the construction of kilns are such developments as have been made by the company to obtain economical handling of this type of rock.

One of the signal developments in the current expansion of these works is the installation of a mechanical conveyor by which the quicklime is transported from the kilns to the crushers and at the same time is cooled. This marks a decided step forward in the handling of the material immediately after its removal

from the kiln. The conveyor, which was developed by the Gypsum Company for installation at this plant, will eliminate labor and labor-turnover to such extent that, it is estimated, it will save its cost within one year.

Owing to the increased capacity of the kilns and the more economical performance of the cooling-operation, the capacity of the hammer mill in which the quicklime is ground after cooling has been increased correspondingly. For the same reasons the capacity of the Berquist hoppers has been doubled. Discharged from these bins, the material is conveyed, over poidometers, into Schaeffer hydrators. A second machine of this type has been installed this year, doubling the capacity to 30 tons an hour. And where there were two grinding units before there now are five.

Thirteen New Steel Kilns.

Other Developments

Concurrent with these new installations, the entire plant has been rearranged and renovated for more economical production. As will be explained presently, the two principal products of the Genoa mill are hydrating finishing lime and mason's hydrate. The recent construction makes possible the operation of half of the plant as economically as operation of the whole. Or it will permit of running half of the mill on finishing lime and the other half on mason's hydrate, efficiently and with no possibility of confusion of the two products.

This two-product operation is facilitated by a dual warehouse system newly installed. A new warehouse has been erected and two new Bates valve-baggers have been installed, duplicating the equipment in the old warehouse and increasing the bagging capacity to 1,000 tons a day. This makes possible the operation of the warehouses in a single shift while the rest of the main plan is working on a 24-hour schedule.

The power plant has been re-located and rebuilt. New boilers with a capacity of 300 H. P. have been installed so as to provide for 30 more kilns in addition to the 40 that will be operating by July 1.

The machine shop has been enlarged and old equipment there has been replaced. Arrangements for fuel-handling and firing have been extended, and there has been a complete re-arrangement of trackage so as to accommodate the new warehouse and to give additional facilities for spotting cars, this, again, expediting the handling of an increased production.

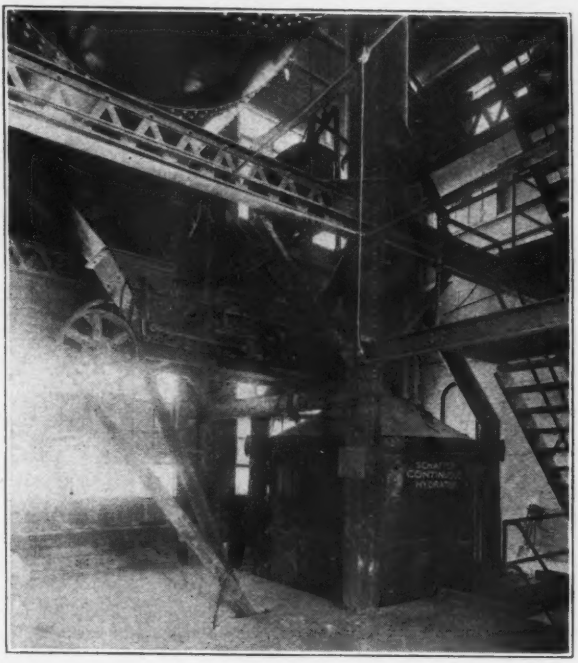
The total cost of the current expansion program at Genoa is well in excess of a quarter of a million dollars. On its completion, the mill's capacity will be 500 tons a day. Fifty-five men are employed in the quarry; 65 in the main mill and 10 in the warehouse. All of the works are of permanent, fireproof, concrete-and-steel construction of the same high standard maintained at the other properties of the United States Gypsum Company throughout the country.

Character of Products

The principal product of the Genoa establishment is Ivory Hydrated Finishing Lime. It also turns out out some crushed rocks for road building. Because of the high magnesium content—46 per cent—of the rock, the Genoa finishing lime is exceptional for its whiteness, its cool working proper ties and its slow setting. Compared with hydrates with a higher calcium content, it has from 5 to 10 per cent more covering capacity per unit amount used in the mixture; it saves from 2 0to 25 per cent in labor during application because of its easy spreading and free working qualities, and it minimizes the occurrence of lime pops. This product is superior to hydrates of higher magnesium content because it is derived from a rock that occurs in massive formation without partings which admit of the presence of foreign matter and because of the modernity of the machinery by which it is produced.

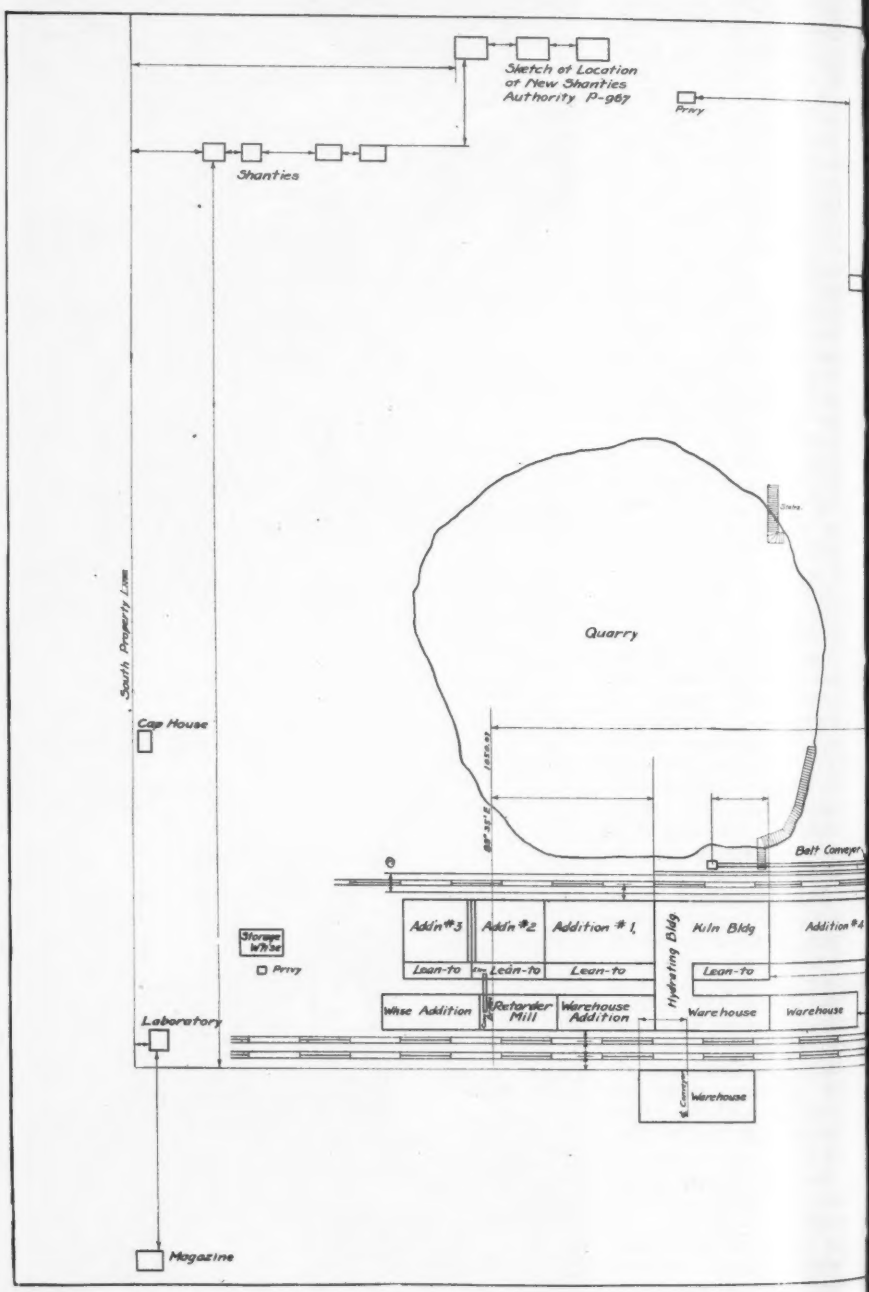
This finishing lime stocks better than ordinary lump lime and does not air-slake under average storage conditions. It is thus advantageous to the dealer because it reduces his fire hazard. Its average covering capacity is about 1,000 square yards to the ton.

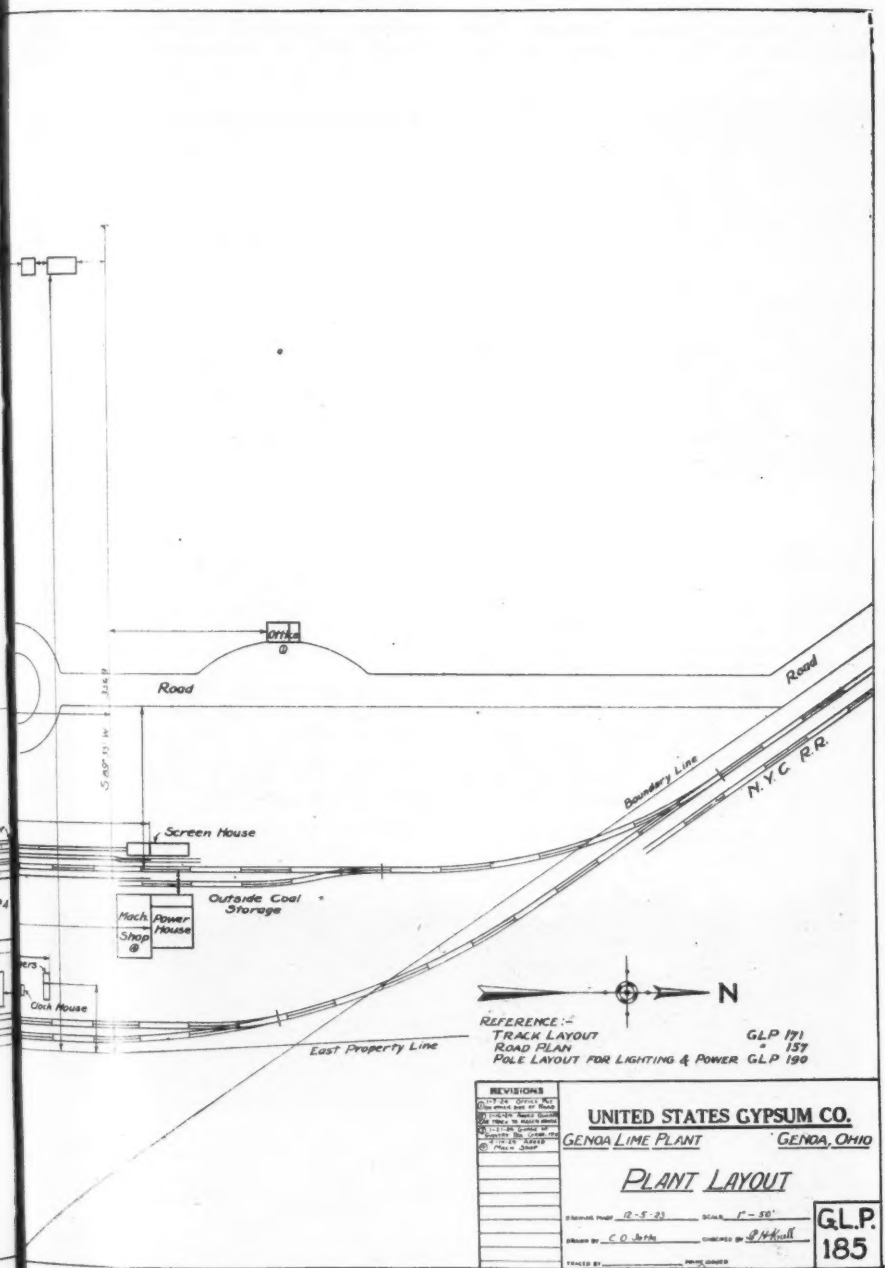
The exceptional plasticity referred to is a peculiar property of the hydrates from the Northwestern Ohio field. It is due to a physical, rather than a chemical, difference from other limestones



Schaffer Hydrator.

Gantry Cranes.


Sketch of Location of New Shanties Authority P-967
Privy
Shanties
South Property Line
Quarry
Cap House
Belt Conveyor
Addn #3
Addn #2
Addition #1
Kiln Bldg
Addition #4
Lean-to
Lean-to
Lean-to
Lean-to
Storage White
Privy
Hydrating Bldg
White Addition
Retarder Mill
Warehouse Addition
Warehouse
Warehouse
Laboratory
Warehouse
Magazine


Office
Road
Road
Boundary Line
N.Y.C. R.R.
Screen House
Outside Coal Storage
Mach. Shop
Power House
Coal House
East Property Line
N
REFERENCE:-
TRACK LAYOUT G.L.P. 171
ROAD PLAN " 157
POLE LAYOUT FOR LIGHTING & POWER G.L.P. 190
REVISIONS
UNITED STATES GYPSUM CO.
GENOA LIME PLANT GENOA, OHIO
PLANT LAYOUT
G.L.P. 185

and because of it the demand for Northwestern Ohio finishing limes is practically national.

The United States Gypsum Company distributes these products in all centers from Denver, Colorado, east. The plant is located on the Norwalk division of the New York Central railroad. This permits of the quick movement of a large tonnage, giving consumers good service with a minimum of interferences from seasonal traffic fluctuations that might affect an establishment in a more remote situation.

Personnel

Headquarters of the United States Gypsum Company is at 205 West Monroe street, Chicago. The works manager at the Genoa plant is J. R. Davis; the chief chemist, J. Wiss; the superintendent in charge of the recent construction, W. De Rohn.

Mr. Davis has been with the Gypsum Company about 10 years. He was a graduate, in mechanical engineering, from Cornell University. Mr. Davis belongs to the new type of engineer that places emphasis on the scientific control of quality rather than on the old rule-of-thumb method of governing output. He entered the employ of the United States Gypsum Company in the laboratory of its Oakfield, New York, plant. He later began his executive training as assistant superintendent and subsequently had charge of the plant at Blue Rapids, Kansas. Already he has started investigations looking toward the further improvement of the product of the Genoa plant and has developed excellent laboratory equipment with an extensive organization under charge of Mr. Wiss.

Tennessee Highway Magazine

The Tennessee Good Roads Association has commenced the publication of a monthly magazine entitled Tennessee Highways. The publication is to serve as an agency with which the association will spread the propaganda of Good Roads for Tennessee. The association has been carrying on an active campaign for good roads for the past two years. During this time great progress has been made. A complete organization has been set up throughout the state, including a chairman for each county, one for each civil district and even one for each school district. The officers of this association are P. M. Estes, president; Cowan Rodgers, vice-president; E. D. Reed, vice-president; Thos. B. King, vice-president; Mrs. Claude D. Sullivan, secretary; E. A. Lindsay, treasurer. Mrs. Claude D. Sullivan is editor of the Tennessee Highways.

Contracting and Material Company announces that it has removed its general offices to the American Fore Building, located at 844 Rush Street, Chicago, Ill. Wm. P. Cagney is president of the company.

Genoa Lime Property in 1915 Before Plant Was Built.

The Freight Rate Situation Today

By JOSEPH H. DONNELL,* for Exclusive Publication in PIT AND QUARRY.

THERE HAS never been a time when our transportation agencies, especially railroads, engaged the attention of the public more than today.

One has but to pick up a daily paper, trade paper or magazine and inevitably he finds an article or an editorial on transportation matters, especially freight rates. This too is reflected in the conversation we hear at the office, on the car, in the club, in fact wherever business men gather.

Distribution More Vital Problem Than Production

There is a reason for this and it has been clearly stated in a circular sent out from the Chicago office of the Mid-West Regional Advisory Board, which says:

"A matter of vital importance to everyone is the recognition of the evolution which is going on throughout the country in the change of our great national problem from one of production to that of distribution. We are coming to the realization that our real task is not that of producing a commodity, but rather that of markets and distribution."

Doubtless one of the principal factors in connection with the finding of a market, is the cost of getting the product to it and hence we are vitally concerned with the freight rate.

It is not uncommon to hear that "the railroads are robbers", "freight rates must come down", that railroad earnings are "guaranteed by the government" and similar expressions.

That these misstatements are usually made by irresponsible, misinformed persons, many people fail to consider and gullibly swallow "hook, line and sinker."

Some Mal-Adjusted Rates

It may be true that some rates on individual commodities are mal-adjusted. It would be strange if this were not so. Manifestly in a rate structure involving millions of rates on thousands of different commodities it is impossible to have each rate perfectly adjusted to maintain all of the many relationsships between localities and commodities, which are necessitated by the demands of market and commercial competition.

Joseph H. Donnell

That these rates which are in need of adjustment should receive attention, all will concede. An error discovered in the rate structure, which imposes a hardship upon an industry or which results in unjust discrimination, should be corrected, just as in the case of a misspelled word in a manuscript, a wrong figure in a mathematical calculation, or any other kind of an error.

That these individual cases requiring adjustment will be taken care of we may be sure. Those who are suffering from the results of a discriminatory situation have recourse to the carrier's sense of fair play and finally to the Interstate Commerce Commission. These situations which are the inevitable result of many horizontal increases and subsequent general decreases in rates, are being ironed out every day.

Commercial industry as a whole is more concerned with the general rate level than with individual rates, with the general plan of rate construction than with the making of an individual rate or set of rates; indeed, is more concerned with the adequacy of service, including ample equipment, than with the rates themselves.

It only takes a few days of car shortage to inspire a veritable deluge of emphatic complaints from shippers. Those shippers who complain of high rates would gladly pay the rates if they thought that failure to do so would precipitate a car shortage. Is it not far better to shrink ones profit

*Editor Trade & Transportation Bulletin, Member Rate Board of Swift & Co., General Traffic Manager, Stein, Hall & Co., and Former Rate Expert of Interstate Commerce Commission.

two or three cents on the dollar than to be loaded down with profitable orders and have no cars to ship them in?

Rates of Necessity Higher Now

Now any thinking man will concede that it takes money to buy cars, properly maintain them and supply them in the required quantities to shippers scattered over the face of the entire country. That this is but one small item of the carrier's expenses, may also be taken into consideration.

Capital charges, terminals, tracks, rolling stock, taxes, wages, all of these things have so increased within the last several years as to render it imperative that the rate level of 1924 be higher than the rate level of 1914. What commodity, what service, what thing of value is there that can be bought today at 1914 prices? Relatively few things, we must admit, and the producers of those very rare commodities are doubtless willing to exchange places with the man who is selling his product at a high price, notwithstanding the fact that the latter may be paying a proportionately high freight rate.

Are the carriers getting rich on today's rates? If we are to believe the Interstate Commerce Commission, and I am sure that we may take their figures as being authoritative, the carriers are not waxing fat at the expense of industry.

R. C. Fulbright, Chairman of the Legislative Committee of the National Industrial Traffic League, a national organization of shippers, in a statement to the Senate Committee on Interstate Commerce asserted that the railroads as a whole are earning far less than contemplated in the Transportation Act of 1920.

Combined Net Earnings Average Only 2.29 Per Cent

For example, the combined net earnings of eight representative Class 1 railroads, during the four year period 1920-1923 average only 2.29 per cent as contrasted with 5½ to 6 per cent mentioned in the Transportation Act, as constituting a fair return on the value of the carriers' property.

No Return Guaranteed To Carriers

It should be understood that the Transportation Act guaranteed no return to the carriers, despite numerous statements to the contrary. The Act did empower the Commission to fix rates, as nearly as possible, on a level calculated to yield the carriers a fair net return on the value of their properties, presumably 5½ to 6 per cent. This the Commission tried to do but that it erred on the side of low rates instead of high rates is quite apparent from the figures just presented.

Does the government guarantee a reasonable return or any return to the carriers? It does not. On the other hand, it is empowered to take from them 50 per cent of any earnings in excess of the so-called standard return and these earnings are used to establish a sinking fund for loans to carriers who are in distress. Thus we have the anomalous situation of a carrier earning slightly more than the specified return, turning 50 per cent of such excess over to the government, to be in turn loaned to a competing road.

Futile to Think of Rate Reductions

Calm consideration of these facts can lead to but one conclusion. It is futile to think of general reductions in rates. Further, a reduction if ordered by the Commission, would be decidedly inimical to the shippers' interests and certainly in no way could it be considered for the public good. It is more important now that the carriers function efficiently and move the traffic. This, more than any other thing, will tend to stablize

Rate of Return on Property Investment

8 Class 1 Carriers—1920-1923

Road	1920	1921	1922	1923	Average Year 1920-1923
Erie R. R.	Def.	1.23	0.48	3.83	0.64
Maine Central	Def.	Def.	4.29	2.90	0.37
N. Y., N. H. & H.....	Def.	0.60	2.81	3.03	1.11
L. & H. R.	Def.	5.66	1.69	8.40	3.78
B. & O.	Def.	2.98	3.21	5.43	2.80
C. & O.	2.27	3.75	4.07	7.60	4.49
L. & N.	0.50	1.19	4.98	5.37	3.10
T. & P.	Def.	2.16	2.74	3.82	2.08

Average of 8 roads for four years.....2.29%

business and keep it on an even keel. If this is done and business continues good it is quite possible that the resulting volume of tonnage may contribute to lower operating costs for the carriers and thus eventually enable them to make the contemplated fair return on their properties. Indeed it is possible that given a long period of uninterrupted business prosperity there may be a rate reduction, but this is so remote as not to be included in the possible or desirable things at the present time.

If shippers would serve their own interests and recognize that the carriers' and shippers' interests are indissolubly bound together, they should be on the alert to defeat the aims of the more radical legislators who now seek to slash railroad valuations and hold out alluring but utterly false promises of rate reductions. It requires no great powers of discernment to see that these gentlemen are seeking government ownership of railroads and that they realize that this may come about if they can but put the roads in bankruptcy.

In view of the fact that rates are supposed to be based on 5¾ per cent of the property values, a reduction of 50 per cent in valuation appraisals, would bankrupt the roads very quickly. It might be well to add casually that numerous other businesses would be similarly affected. The railroad securities held by life insurance companies and individual stock and bond holders throughout the country would shrink in value, perhaps become valueless, and the ultimate result would be business chaos and disaster.

A Scientific Rate Structure

There is a tendency now, gathering momentum as the public enthusiasm grows, toward a so-called scientific rate structure. That a scientific rate structure would be highly desirable is so obvious as to require no argument. Anything that is really scientific is all right, but we must be very careful in our endeavors to secure such a rate structure, and not overlook the good features of the present structures, under which commerce has grown from a minute and inauspicious beginning to the mighty power it is today. The recent report by Commissioner Eastman of the Interstate Commerce Commission, shows the tendency toward mileage rates in the Southeast; further the proposed mileage scales for Trunk Line territory, Eastern and Interior Eastern points tend to confirm this leaning toward the distance method of rate making in contrast to the differential method so generally used today.

There is much to be said for a flexible mileage scale. It is a thing of beauty and satisfying to the theoretical eye. Just how it will work out in practice over a widespread territory, where the traffic volume is heavy and commercial competition as well as carrier competition is keen, remains to be seen. On the other hand, rigid or inflexible mileage scales are an abomination. They are unscientific, result in discriminatory situations and are wholly impractical in that they have the effect of localizing business, eliminating competition between markets and thus promoting local monopolies.

Awakened Thought of Shippers and Carriers

The encouraging thing in the outlook today is the evidence on every hand of awakened thought and a mutual desire on the part of shipper and carrier to unite in such measures as will tend to promote the common good.

This constructive attitude is indicated by expressions emanating from the railroads, traffic clubs, shippers' organizations, and by the formation of such organizations as the Mid-West Regional Advisory Board, organized for the specific purpose of enabling shippers to meet periodically with officials of the carriers in its territory, to determine future transportation needs, to study production, markets and trade channels, and through accumulated knowledge on these subjects to seek improvement in the distribution methods employed by agriculture and industry, to adjudicate disputes informally, to take an active part in the promulgation of transportation regulations, and to have a direct voice in all of the activities of the Car Service Division of the American Railway Association.

Before a lower rate level can be had the carriers of this country must be permitted to get on their feet financially, and to build up their properties. Their credit must be strengthened and above all things they must be given a rest, a breathing spell, from radical and subversive legislation.

New Railroad Legislation Before Congress

It will doubtless come as a surprise to most of you to know that a total of 172 bills and resolutions proposing new railroad legislation or the repeal of laws now in effect had been introduced up to April 12th in the sixty-eighth Congress, which began its sessions on December 4th. The bills mentioned include only those more or less directly affecting the railroads as transportation organizations and do not include a number of others which affect corporations generally and which, while primarily dealing with other subjects, would also directly or indirectly affect the railroads to a considerable extent.

According to information given out by the Committee on Public Relations of the Eastern Railroads, the most numerous class of railroad bills includes those dealing with rates, most of them intended, in one way or another, to bring about reductions in rates, although one or two perhaps are not intended directly for that purpose but arise from objections merely to the method of rate-making contemplated by the present law.

Many Rate Bills Up

Of the rate bills there are 59, of which 30 are to prohibit the collection of a surcharge in connection with the payment for parlor or sleeping accommodations. There are also 29 other rate bills, including seven to amend the long and short haul provisions of the fourth section of the act and three bills providing for the sale of mileage books at a reduced rate.

There are eight bills to repeal section 15-a of the interstate commerce act, which contains the general rate-making rule directing the Interstate Commerce Commission, in its regulation of rates, to try to allow the railroads "as nearly as may be" a fair return. There are also four bills to reduce rates by specific amounts or to re-establish the rates in force at a given date and four bills or resolutions directing the Interstate Commerce Commission to readjust rates. There are two bills to reduce fares for a particular class of persons, one for veterans and one for blind persons.

Radical Bills Introduced

One of the interesting developments during this session and the last session of Congress has been the introduction of bills to regulate rates by direct legislative action or to give specific instructions to the Interstate Commerce Commission as to how it shall regulate or adjust rates. Entirely new systems of rate-making and valuation are proposed in bills introduced by Senators La Follette, Brookhart and Dill, while a duplicate of the La Follette bill has been introduced in the House by Representative Huddleston. In addition to a resolution proposed by Senator Trammell of Florida providing for an investigation of rates with a view to bringing about a substantial reduction, two resolutions have been proposed and given serious consideration in committee to direct the Interstate Commerce Commission to readjust rates.

While many of the bills would probably not be characterized as particularly hostile to the railroads, the great majority of them would have the effect of reducing their revenues or increasing their expenses, or both, and very few can be considered in any way in the interest of the railroads. No railroad bill has yet been passed by Congress at this session.

Not the Time For Railroad Legislation

This is not the time for passing railroad legislation. We have enough legislation now to insure adequate regulation. In this shippers and carriers are agreed. "Hands off the transportation act" expresses a sentiment which has been strongly voiced by all interests. It is a constructive, sound policy and should receive the support of business men generally. Finally it is well to remember that rates today are no higher than corresponding prices on commodities, indeed they may be said to fall below the commodity price level in a great many cases. In any event, our country reflects prosperity, business is good and we have little to worry about. Rates are not hurting us generally. Where we are being hurt individually we have but to handle each case on its merits and the proper adjustment may be secured through the carriers and the Commission.

The Toledo office of the Toledo Stone & Glass Sand Co., formerly located at 319-320 Ohio Building, has been discontinued, and the general office has been transferred to the plant at Silica, Ohio. The mailing address is Sylvania, Ohio, R. F. D., No 2.

U. S. Gypsum Company Completes New Plant in Texas

Sheetrock Mill, Final Unit of Factory, Goes Into Operation in May; Daily Output Is 400 Tons of Plaster and 150,000 Square Feet of Wallboard.

THE UNITED STATES Gypsum Company during May completed and put into full operation the final unit—the Sheetrock mill—of a new gypsum plant at Sweetwater, Nolan county, Texas. This is the twenty-second gypsum-working establishment owned by the Gypsum Company, located at points between Staten Island, New York, and Amboy, California. It is the fifth plant built especially to serve the building and other industries in the Southern tier of states, and the only plant in Texas which manufactures gypsum wallboard as well as other products.

Sweeping from Southern Kansas down across the western half of Oklahoma into Texas at the southeastern corner of the panhandle and thence into the southwestern corner of that state, is one of the most extensive deposits of gypsum that have been discovered in America. It varies in width, with an average of approximately 20 to 25 miles. Except where the original formation has been changed by erosion or other geological forces there are two distinct ledges, the upper with an average thickness of 20 feet, the lower running about 30 feet. Besides those deposits of gypsum rock, there are at some points through this belt rich deposits of gypsite, or "gypsum clay" or "gypsum earth."

Character of Raw Materials

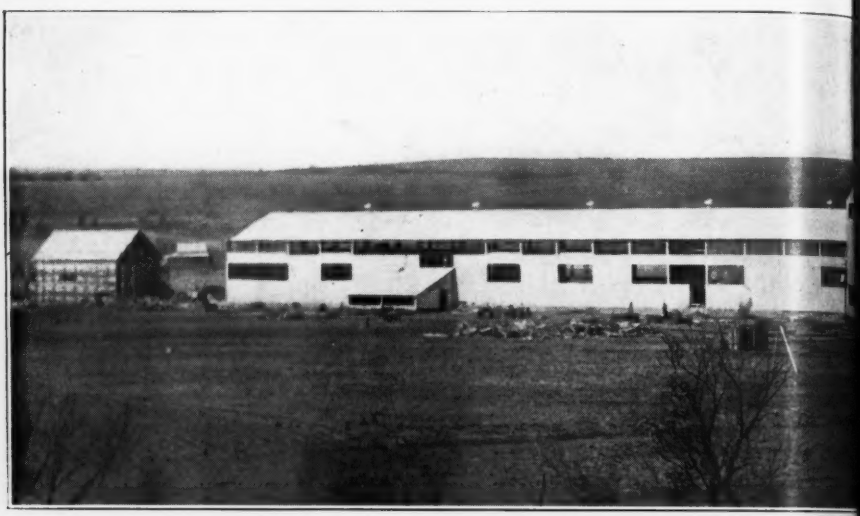
The United States Gypsum Company has operated in this field for 22 years. Its oldest plant in this territory is located at Blue Rapids, Kansas. Later, others were erected at Southard, Oklahoma, where there is gypsum of excellent quality but no gypsite, and at Eldorado, Oklahoma. Other firms have been manufacturing limited lines of gypsum products in Texas, but none of them on the scale made possible by the new property of the Gypsum Company.

This property was acquired in 1920 after two years of prospecting and experimentation on the minerals obtained from it. Explorations were conducted to locate a property where both gypsite and gypsum occurred in quantity and quality adequate to large-scale industrial exploitation with drainage, transportation and market conditions such as to justify the erection of a permanent plant capable of future expansion.

All these requirements were found to be met on a tract 3 miles east of Sweetwater. There gypsite beds were discovered with a slight overburden, ranging in depth from 4 feet at the southern, to 10 feet at the northern end. This deposit, as it appears on this property, is one and a half miles long and a half-mile wide for half its length, and the gypsite runs approximately 80 per cent pure calcium sulphate, in excess of manufacturing requirements: in fact, so pure that it is necessary to tone it down slightly for some uses.

Throughout the property, both ledges of the rock formation extend. The overburden, again, is light; the upper deposit has an average thickness of 18 feet; under it is a stratum of sandstone which, in turn, is underlain by the second ledge of gypsum with an average thickness of 15 feet. The rock, tested in the Gypsum Company laboratories, was found to be 98 per cent pure. Its quality was found to be sufficiently high to make the whitest plaster manufactured in the United States—whiter, even, than that made from rock imported from Europe. It possesses quality high enough to permit of the manufacture of the finest grade of moulding, pottery, dental and orthopedic plasters, as well as gypsum wallboard and other materials used in building construction.

During the period of prospecting, the United States Gypsum Company shipped carloads of both rock and gypsite to its other plants, and the manufacturing tests made there supplemented the laboratory tests in



United States Gypsum Co

justifying the expectation of low-cost, high quality manufacture. Subsequently, the concern purchased outright 300 acres of the land and the mineral rights to 80 acres more.

Mining and Quarry Conditions

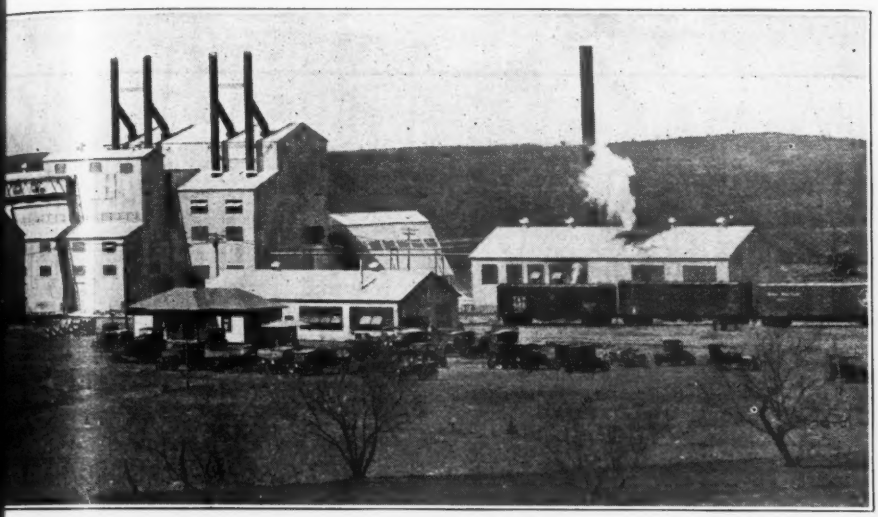
Sweetwater Creek runs through the property and, inasmuch as most of the acreage lies 20 feet above the level of this stream, drainage conditions are exceptional. This makes possible continuous operation without the intervention of wet seasons, and throughout the construction of the mill every precaution has been observed to assure and facilitate continuous working.

Soil overlies the gypsum rock to an average depth of 18 feet. This overburden is removed by a one-yard, gasoline-operated, drag-line excavator. The waste is loaded into side dump cars and hauled by the company's own locomotive a short distance to a dump. Drilling is done by electrical rotary drills adapted from those used in the coal industry for especial use on gypsum. The rock then is shot with low-grade, non-straining dynamite—non-staining for the same reason that it is used in salt mines; namely, to assure pure color in the finished product. The rock is reduced to one-man size, is hand-loaded into two-ton cars and is pushed to an incline up which it is drawn by electrically operated cables into the mills. Mechanical haulage from the quarry will be installed as soon as necessity requires.

Extraction of the gypsite is somewhat easier. Its over-burden averages 6 inches in depth and is covered with a small growth of mesquite bushes and cactus. After clearing, the land is plowed by horse-drawn discs, and the overburden is removed by scrapers. Then the bed is disced again and the gypsite is hauled in wheel scrapers to a trap located over a standard-gauge railroad track, where the gypsite is discharged into 50-ton gondola cars especially constructed, on specifications furnished by the Gypsum Company, so that the gypsite can be removed easily. The loaded gondolas are hauled 6 miles by the Texas & Pacific railroad to the mill, where they are unloaded by a traveling crane with a 1¼-yard clam either into the mill proper or into a gypsite storage house. The present storage capacity is 1,000 tons and the sheds are designed to permit of easily doubling this capacity.

Flow and Mill Equipment

In brief, the manufacture of gypsite plasters (known to the building trades as "dark" plasters) consists of its removal from storage into kettles where it is calcined or, more properly, dehydrated; its discharge from the kettles to hotpits; its screening, cooling and mixing; the addition of retarder, and sacking.



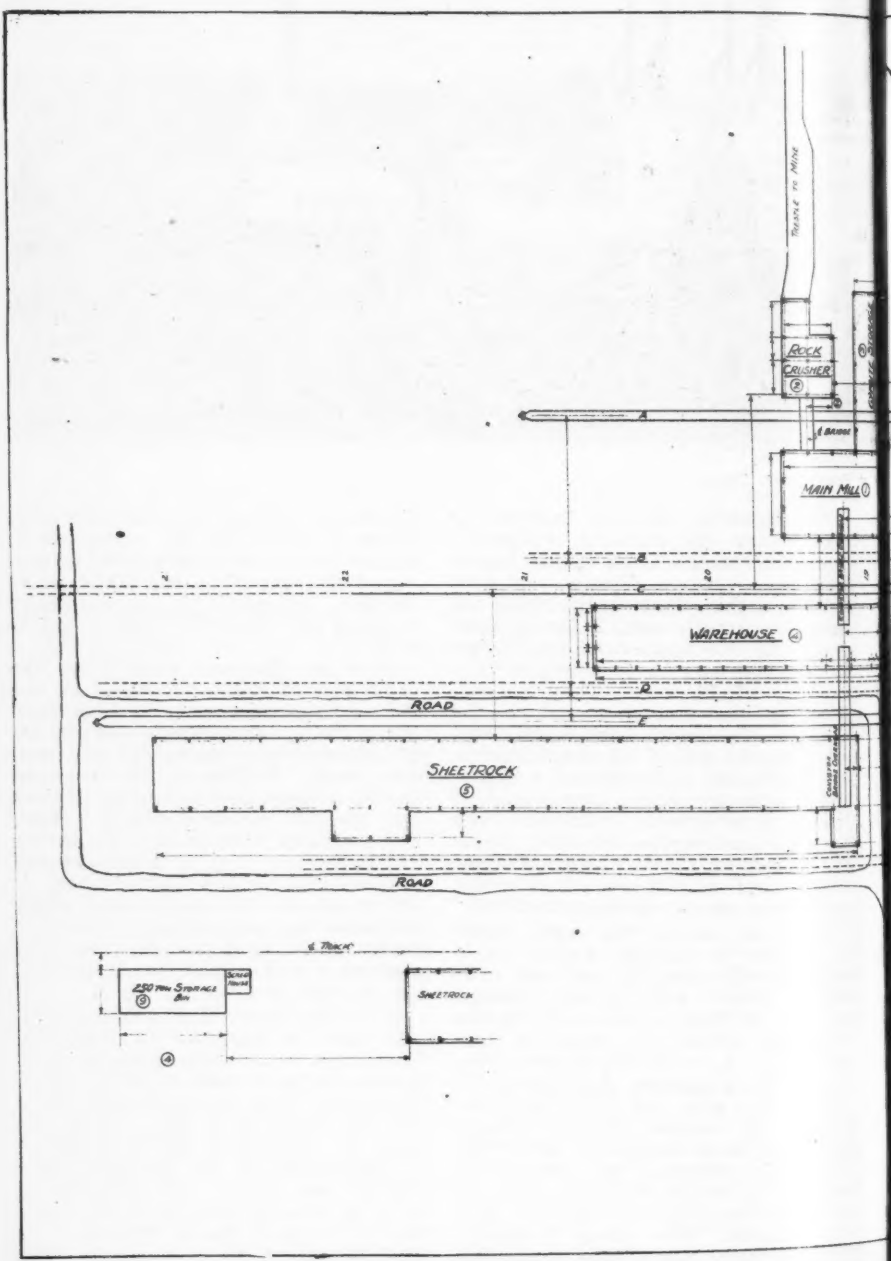
at Sweetwater, Texas.

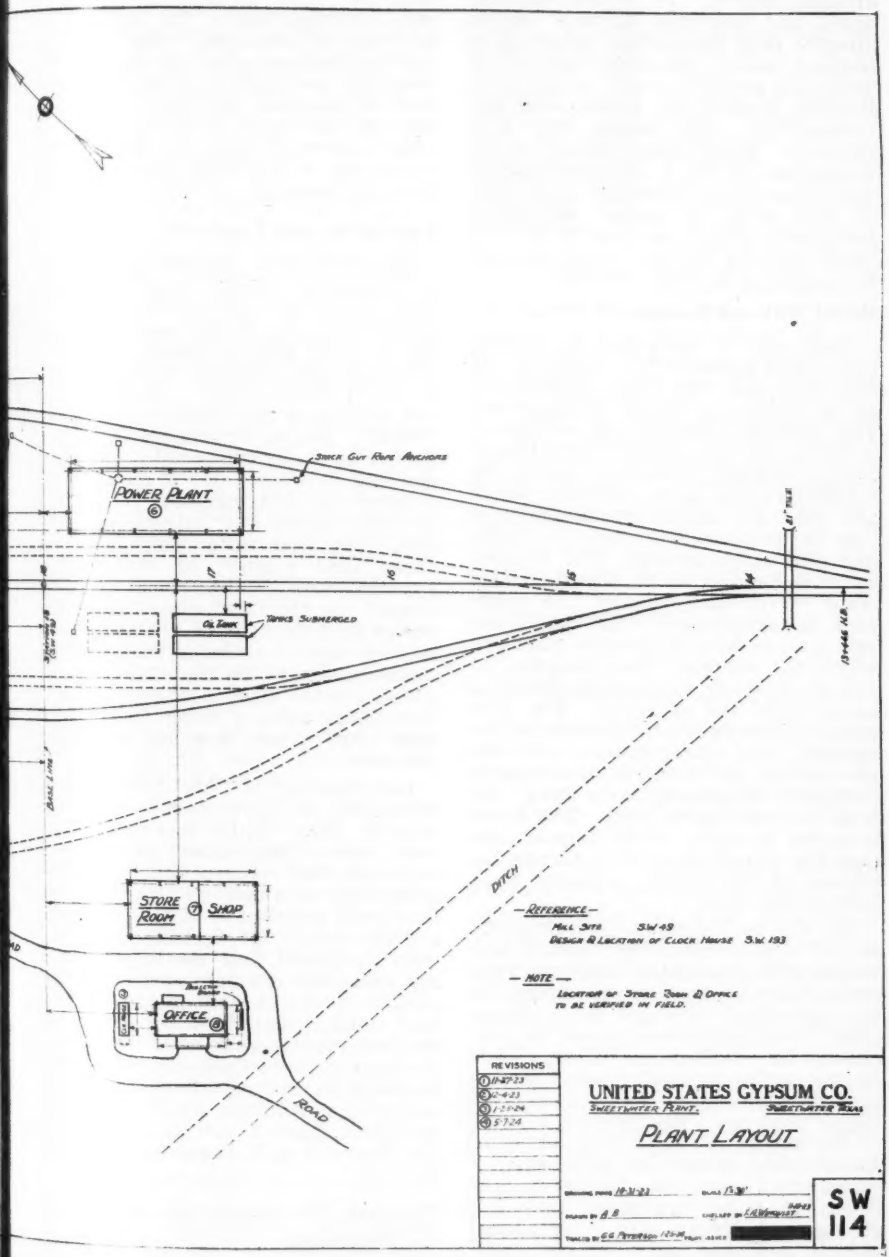
In execution of this process at Sweetwater, the material is elevated from the storage house to the kettles by bucket elevator. There are 4 such kettles in this plant; ordinarily 2 are used for gypsite and 2 for gypsum rock. All are approximately 10 feet in diameter and 12 feet deep with a capacity of 12 tons. They are oil-fired by the equipment which the Gypsum Company has found best suited to the use of oil in calcination. They are steel jacketed and are provided with the latest improved settings. Experienced calciners who have had training in the other plants of the concern are in charge of these kettles and quality-control is made possible by recording thermometers.

From the kettles the stucco flows by gravity to hotpits whence it is automatically elevated and run over screens which extract any foreign matter. It then is conveyed to the warehouse where it is placed in storage bins. As it is withdrawn from storage for shipment, the retarder is added. This step, one of the most important to assure exactly proper quality for each locality to which the plaster is shipped, is effected by means of a device which the Gypsum Company has patented for this specific purpose. The stucco is drawn from the bins into a hopper and the correct amount of retarder is added by an apparatus so arranged that it is impossible to dump the stucco into the mixer without the retarder also. Fibre is added in the mixer; it is mixed the proper time; then is conveyed by gravity to the Bates valve baggers, where it is automatically weighed and sacked in either paper or jute.

Gypsum follows essentially the same process-route. Brought up the incline from the quarry, it is dumped into a Pennsylvania single-roll crusher of sufficient size to handle any one-man rock. It then is run over an electro-magnet which removes spikes and similar metallic quarry refuse. The rock then is reduced to 1¼ inches or smaller particles in a Butterworth & Lowe pot cracker, after which it is run over a Seaver screen which performs two separations. One size resulting is used for the specialty plasters and the other, for Sheetrock, the gypsum wallboard.

From this point forward, the gypsum mill is equipped in duplicate. There are two storage bins, of sufficient capacity to permit of operating the quarry on a one-shift basis while the mill runs 24 hours. From the bins, the material is fed by a device of the company's own designing into Jeffrey swing hammer mills where it is so reduced that it all will pass through a No. 6 mesh. Thence it is run through a Kent separator; the fines are removed and conveyed directly to the land-plaster bins, while the coarser material is elevated into


TRAMWAY TO MINE
ROCK CRUSHER
MAIN MILL
WAREHOUSE
ROAD
SHEETROCK
ROAD
250 TON STORAGE BIN
SHEETROCK


STOCK GUY ROPE ANCHORS
POWER PLANT
⑥
OIL TANK
TANKS SUBMERGED
STORE ROOM
⑦
SHOP
OFFICE
⑧
DITCH
ROAD
—REFERENCE—
MILL SITE SW 49
DESIGN & LOCATION OF CLOCK HOUSE SW 193
— NOTE —
LOCATION OF STORE ROOM & OFFICE TO BE VERIFIED IN FIELD.
REVISIONS
① 11-27-23
② 12-4-23
③ 1-2-24
④ 5-7-24
UNITED STATES GYPSUM CO.
SWEETWATER PLANT. SWEETWATER TEXAS
PLANT LAYOUT
SW 114

a bin over Munson 36-inch under-runner buhrstones driven by vertical individual motors. It is then elevated again and conveyed to bins located directly over the kettles where it is calcined under the same control to which the gypsite plaster is subjected. Hotpits, feeders and coolers also are substantially the same. The rock stucco is moved then either to the warehouse where it is given special processing for different products and, in that case, is sacked through a Broughton mixer, or else it is conveyed directly to the Sheetrock mill for manufacture into wallboard.

Board Mill and Equipment Details

Sheetrock is fabricated in a separate steel-and-concrete building, 40 feet wide and 400 long, designed so as to permit of ready enlargement. The machine forming the wallboard is of the special design of the United States Gypsum Company, as is the continuous kiln also. Plaster, water and fiber are mixed mechanically so that the material goes onto the forming rolls continuously. The finished board is handled by an electric bridge crane which also handles the paper used in manufacture. All the necessary control work is done on machines which the company has designed itself or by other mechanisms which it has adopted and perfected. The National Underwriters' Laboratory supervises this quality-control and the products of the United States Gypsum Company Sheetrock mills bear the label of that organization. The board is moved by crane either directly into cars for shipment or into storage facilities of which the capacity is a half-million feet.

All the buildings on this property are of steel construction, roofed and walled with corrugated iron, with concrete floors. Power is generated by the operating company in a steam plant where super-heat steam is produced for high-speed, directly-connected engine generator sets. Power is distributed by the group system of motor hook-up. The boilers as well as the kettles are fired with oil. The Ranger field is but 100 miles east of Sweetwater and the Burke-Burnett field, 125 miles northeast, thus assuring an indefinite supply of cheap, quickly available fuel.

Supplementing the mill-facilities designed for continuous operation, outside rock storage piles are being accumulated, thus assuring operation of the plant despite weather conditions that may limit working of the quarries. Storage space for 10,000 tons of rock is provided. The rock is handled mechanically both ways. The crushers are capable of handling 150 tons of one-man rock an hour. This end of the plant is designed on a scale that will facilitate inexpensive expansion of the other units as occasion may require.

Production and Products

Approximately 150,000 square feet of Sheetrock wallboard and Gyp-Lap sheathing a day are produced in the board mill. The daily capacity of the plant is 400 tons of plaster. Half of this is gypsite ("dark") either cement or wood fibre plaster. Half of the 200 tons daily production of rock, or "white", plaster is consumed in the fabrication of wallboard. The remaining 100 tons a day is apportioned between Aridize gauging, moulding, pottery, dental and orthopedic plasters. The Sweetwater plant also produces land plaster, or agricultural gypsum, and crushed rock used by cement or chemical companies. An exceptional feature of the establishment is that it includes facilities for screening by which the rock may be reduced to the sizes most adaptable to its various uses, a thing that is not done by other gypsum crushing concerns.

Construction of this factory was scheduled to have begun early in August, 1923. Little was done, however, before September and it was expected that construction would require fully nine months. The builders have been in advance of this program almost from the outset, however, with the result that the first unit of the plant, the crushers, went into operation in March and on the 21st of that month the first shipment of crushed gypsum, rock went out to the Portland Cement Company. The second unit consisting of the crushing, calcining and mixing plants went into operation April 1 and the final unit, the Sheetrock mill, began operation on May 20.

Trackage, Transportation and Market Conditions

This property is crossed by the main lines of the Texas & Pacific and the Santa Fe railroads, and extensive

siding arrangements have been made on the former to promote quick handling of the mill's products over its trackage. The Gypsum Company has arranged for mixed car shipments of its several products to building material dealers and for the stop-over privilege for such carloads in Texas. This makes possible numerous advantages to builders throughout the state and, in slightly less degree, to those throughout the Gulf Coast states. Supplementing these arrangements, trackage has been constructed at the plant so that cars may be filled partly with plaster and partly with Sheetrock and other products efficiently and quickly. The Gypsum Company also has installed a standard-gauge locomotive to do its own switching and to hasten the spotting of cars.

Additional trackage was necessitated by the fact that the gypsite beds are located a mile from the Texas & Pacific tracks, and a part of the construction just finished was 2 miles of standard gauge track and 2 bridges; this mileage including the tracks to the gypsite beds and those around the mill and the switch-tracks.

Sweetwater, 3 miles from the factory, is served also by the Kansas City, Mexico & Orient railroad. Hence 3 systems are readily accessible as means of distribution, and it is possible that in the future a direct connection will be made between the plant and the Santa Fe.

These exceptional transportation facilities make the products of the Sweetwater plant quickly and efficiently available to the vast southern, and more particularly the southwestern market. The Gypsum Company has long been aware of the buying-power of this market because of the steadily increasing demand for the products of its mills at Southard, Eldorado, Blue Rapids and Plasterco, Virginia. And the fact that the only gypsum wallboard mill in Texas is an integral part of this establishment has large meaning to a market in which ship-lap for interior finish is becoming increasingly scarce.

Another advantage provided by the accessibility of 3 large railroad systems is that movements of gypsum products will not be interfered with by seasonal fluctuations of traffic due to the movement of crops and other commodities.

H. D. Humphreys.

Personnel

H. D. Humphreys is works manager. Mr. Humphreys has been with United States Gypsum Company about 22 years, having had experience at its Alabaster, Michigan, and Oakfield, New York, mills before having been put in charge of its Plasterco, Virginia, establishment, whence he was transferred to Sweetwater. The superintendent of the Sheetrock mill is F. J. Gaugh, who first went into the Chicago laboratory of the company and afterward was in charge of wall-board manufacture at Fort Dodge, Iowa, and Oakfield. The chemist, in charge of quality, is A. M. Turner, who recently came to the Gypsum Company from the Colorado School of Mines.

From 150 to 250 men were employed on construction of the mill and 150 men will be employed continuously in its operation.

Utilization of Anhydrite

The anhydrous form of gypsum, which occurs in large quantities in some mines, is difficult to utilize. In the hope of obtaining information which may lead to a more efficient utilization of such types of gypsum, a study of the chemical and physical properties of the whole series of calcium sulphates has been undertaken by the Department of the Interior at the Non-Metallic Minerals Station of the Bureau of Mines, New Brunswick, New Jersey. The bureau will attempt to determine (1) the stability of gypsum and anhydrite in their relation to gypsum ore reserves and (2) the properties of anhydrite in their relation to better utilization. A preliminary study has been made of physical-chemical work that has already been accomplished bearing on this subject. Samples of anhydrite and gypsum have been obtained from gypsum mines.

Some Points of Comparison Between the English and American Lime Industries

*By C. W. D. ROWE, Managing Director, The Dunstable Lime Co., Ltd., Petersborough, England

The English lime industry as a whole lacks that which the National Lime Association shows that your own industry possesses to a very high degree—cooperation. We have several associations of lime manufacturers, but we have not, as yet, a national body working for the industry as a whole. One reason for this is, I think, the very large number of types of lime that we have, ranging from 99 per cent high-calcium chemical limes to limes which are practically natural cement, and the fact that as hydraulic lime materials are so abundant, a very sharp distinction is made between chemical limes and mortar limes. Some degree of hydraulicity is insisted upon for building purposes (except finishing lime) although, of course, the high-calcium lime manufacturers are always endeavoring to get a foot into the building trade.

My own company produces a building lime known as greystone, burnt from the grey or lower chalk, which gives a lime containing about 84 per cent CaO and 14 per cent silica and alumina. It has definite hydraulic properties yet has the easy-working properties of a high calcium lime.

The radical difference between our trade associations and your own is that, with the exception of those formed especially for research such as the Glass Association, ours exist primarily for the purpose of securing a fair price for the product by fixing a scheduled price.

Our experience goes to show that our trade associations protect the consumer as well as the manufacturer. Public opinion ensures that the price is a fair one and the result is that in times of bad trade, the industry is stabilized and not cut to pieces; and in times of trade boom, the consumer is protected because our retailers must not only not go below the scheduled price, but they must not sell above. This is very evident today in brick trade, in which I am deeply interested, since the demand for brick in England is far in excess of the supply. We are starting to tackle the housing problem and the Government's working class house scheme alone provides for 200,000 houses per year for fifteen years; so that we are looking forward to a period of steady work for our building trade, which has always been either up on the heights or down in the depths.

We are having the state subsidize our working class houses—not an economic proposition. We feel that if private enterprise cannot produce a suitable standard, then the state must do so just as it provides water supply and drainage systems.

Your competition in the building industry comes from gypsum, but with us it is Portland cement. There is a growing tendency to use straight cement mortars except where cost is a consideration, and then straight line mortars are employed. Our cements must, I think, be easier working than your own, although I hope that there is still room for the use of hydrated lime in concrete.

In plastering, your conditions seem to be the reverse of ours. I find you using gypsum plasters for cheapness, whilst with us patent plasters are used for the finishing of the best work, the rough coat being usually of grey lime. If cost is an important consideration, finishing lime is used. Here again our patent plasters must be more easily worked than yours. Both of these conditions mean that the prices of our mortar and finishing lines must always be kept well under that of Portland Cement and the patent plasters.

Hydration is only just making headway for building limes. We have been going warily because gen-

(Continued on page 104)

*Résumé of an address presented at the National Lime Association Convention May 20, 1924.

Hydrated Lime as a Water Softener

By JOHN J. SCHOMMER,* Industrial Chemist, for Exclusive Publication in PIT AND QUARRY

PRACTICALLY all waters from rivers, lakes, springs, and wells contain substances in solution and suspension. These substances vary in character and in quantity depending on the seasons (wet or dry) and upon the constituents of the earth's crust where the supply of water is located.

Gases such as hydrogen sulphide, oxygen, carbon dioxide, etc., and various salts of calcium, magnesium, sodium potassium are in solution with water. The suspended materials are usually mud or fine clay from eroded rocks or soil and from vegetable matter. Also collodial aluminum, iron and silica in the form of oxides may be present, and, if the supply of water is located in coal mining districts, free sulphuric acid is nearly always present.

Gases may be eliminated by open feed water heaters and the mud filtered out by filtering apparatus or settled out in settling tanks. But the dissolved compounds in water are harmful to the following industries: power plants, laundries, paper making, tanning and textile industries. The principal substances in a raw water that are harmful to the industries are the compounds that cause scale, corrosion, foaming, and priming in boilers; compounds that cause precipitation of soap in the laundry industries; substances that cause spots on goods in the laundry and paper making industries; and materials that interfere with operations in the textile plants.

The loss due to scale forming substances is shown by a table prepared by the University of Illinois.

The scale formed acts as an insulator to the heat and causes the use of excess coal over that necessary when the boiler tubes are free from scale. Also scale involves a shutdown for cleaning purposes which causes an immense loss of heat as well as increased overhead due to need of extra boilers. Hotter fires are needed, often causing overheating and shortening the life of boiler tubes.

Corrosion is usually due to acid conditions. The acid may be due to free sulphuric in the raw water or to dissociation in the boiler of chlorides, sulphates, and nitrides of the salts of calcium, magnesium, iron, etc., thus liberating the corresponding acids—hydrochloric acid, sulphuric acid, and nitric acid. If carbonates are present, carbonic acid is liberated. The liberated acid attacks the boiler tubes and causes danger of explosion due to weakening of parts; repairs due to corrosion; spare boilers necessary in case of corrosion; and shut down and consequent waste of heat.

Foaming and priming may be due to poor design but often is caused by suspended matter and concentration of dissolved salts. These troubles cause water to be carried over into engines and turbines, often wrecking them. Soft water prevents most of the boiler evils.

When untreated water is used in the laundry industry, the lime, magnesia, and alumnia cause loss of soap. The elements just mentioned react with the soap and form insoluble soaps which not only cause a direct loss but leave a deposit on goods which imparts a grey yellow color and is difficult to remove. The amount of soap in these reactions is about 1½ lbs. per 1,000 gallons of water containing 10 parts per million of lime (CaO) water containing 200 parts per million CaO, and this is not high, and would consume 30 lbs. of soap containing 60% fatty acid. Soft water prevents these evils.

The textile manufacturers have difficulty with untreated water in their operations. The insoluble soaps precipitated stick to goods in the washing operations not only causing loss of soap but having disastrous effects due to the presence of these insoluble mineral soaps which affect dyeing and finishing operations. These insoluble soaps with some dyes act as "resists" and with other dyes as a mordant so that in either case uneven coloring results. In dyeing silk, cotton, or woolen materials superior results are had from the use of soft water. For bleaching operations the water must be clear and free from iron.

*Assistant Professor of Chemistry, Armour Institute of Technology, Consulting Chemist of M. Steffen & Company, and for Acme Plating Company.

In the tanning industry iron is objectionable as are certain salts of calcium and magnesium. Hard water should be made soft to prevent most of these evils. Hard water is so called because of certain dissolved salts. It may be temporary hardness or permanent hardness. Temporary hardness is due to the bicarbonates of lime and magnesia while permanent hardness is due to the sulphates of lime or magnesia. A hard water may have either temporary hardness, permanent hardness, or both.

Temporary hardness is imparted to water when water, charged with carbon dioxide or carbonic acid gas, passes through or over the earth's crust where it is composed of marble, chalk, or limestone. All three are different physically, but chemically they are composed mainly of calcium carbonate ($CaCo_3$) which is insoluble. The carbonic acid gas is readily soluble in water and enters it through decaying vegetable matter, from breath of animals, and from smoke of most fires. The gas (Co_2) in water acts as an acid, carbonic acid (H_2CO_3) and forms calcium bicarbonate $CaCo_3 + H_2O + Co_2 = Ca(HCo_3)_2$. The calcium bicarbonate is soluble as long as CO_2 gas is not driven out or displaced. If this takes place by heating or long standing $CaCo_3$ is precipitated $Ca(HCO_3)_2 = H_2O + CO_2 + CaCO_3$. What has been said of calcium carbonate and of calcium bicarbonate may be said in general of magnesium carbonate and magnesium bicarbonate. When untreated water is used in the boiler, the heat liberates CO_2 gas and $CaCO_3$ and $MgCO_3$ are deposited forming a scale.

Calcium sulphate ($CaSO_4$) commonly known as gypsum is an evil scale forming material. It is fairly soluble in water at ordinary temperatures. $CaSO_4$ is soluble to the extent of about 2400 parts per million or 140 grains per U. S. Gal. As the water in a boiler concentrates $CaSO_4$ crystalizes out and forms a very hard, smooth scale.

Magnesium sulphate ($MgSo_4$) is very soluble. It is commonly known as Epsom salts. When alone in water, separation takes place at the edges of the water level. At this point $MgSO_4$ reacts with water (H_2O) to produce magnesium hydroxide $Mg(OH)_2$ and sulphuric acid H_2SO_4. $MgSO_4 + H_2O = Mg(OH)_2 + H_2SO_4$. The $Mg(OH)_2$ is very insoluble and forms a scale while the H_2SO_4 liberated is very corrosive.

Calcium and magnesium also form chlorides and nitrates respectively. These dissociate and form hydrochloric acid (Hcl) and nitric acid (HNO_3). Magnesium compounds are easier to dissociate than calcium compounds.

The impurities that cause most of the troubles due to the use of hard water are removed by use of hydrated lime and sodium carbonate (Na_2Co_3). The operation consists of removing a very objectionable salt and replacing it with one less objectionable or with water.

The acidity which causes corrosion is removed as follows: $H_2SO_4 + Ca(OH)_2 = CaSO_4 + 2H_2O$. Sulphuric acid plus hydrated lime gives calcium sulphate and two parts of water. The $CaSO_4$ is very objectionable and is removed with soda ash Na_2CO_3 as follows: $CaSO_4 + Na_2CO_3 = CaCO_3 + Na_2SO_4$. That is, calcium sulphate plus soda ash gives calcium carbonate insoluble and sodium sulphate soluble.

The bicarbonates are changed to the insoluble carbonates by the use of hydrated lime as follows:

What Scale Costs the Coal User

Horse power of Plant	Yearly cost of coal with clean boilers	Extra cost (or loss) each year caused by scale according to thickness				
		1/32 inch	1/16 inch	1/8 inch	1/4 inch	1/2 inch
100	$2,624	$ 222	$ 324	$ 486	$ 740	$1,190
200	5,248	444	648	972	1,420	2,380
300	7,872	666	972	1,456	2,220	3,570
400	9,000	762	1,114	1,666	2,540	4,047
500	9,376	794	1,162	1,734	2,646	4,250
750	11,250	952	1,392	2,080	3,174	5,100
1000	15,000	1,270	1,860	2,774	4,232	7,990
1250	18,950	1,588	2,320	3,466	5,290	8,490
1500	22,500	1,904	2,782	4,158	6,350	10,200
2000	30,000	2,540	3,718	5,546	8,464	13,604

$Mg(HCO_3)_2 + Ca(OH)_2 = MgCO_3 + CaCo_3 + 2H_2O$. Magnesium carbonate plus hydrated lime gives magnesium carbonate (insoluble) calcium carbonate (insoluble) and two parts of water. Iron, aluminum and magnesium combine with hydrated lime and are removed. Carbon dioxide gas is removed by hydrated lime as follows: $Co_2 + Ca(OH)_2 = CaCo_3 + H_2O$. To state briefly the facts, hydrated lime will remove all the carbon dioxid gas, all the acidity, iron, aluminum, and magnesium and the calcium present as bicarbonate. The calcium compounds, formed or left as in the removal of sulphuric acid, are removed by soda ash.

There are a number of other chemicals that may be used instead of hydrated lime. But hydrated lime is cheaper, just as good in most cases, and with soda ash will remove the total hardness of water thus leaving a soft water.

England's Fire Loss Less Than Ours

Europe is beating us with fire prevention. That is a statement to make us think. We do not accept without challenge an assertion that Europe is accomplishing anything that we cannot accomplish. However it is true that fire loss in the United States is growing each year while in Great Britain it is decreasing. Fire loss in 1921 was $142,000,000 more than in 1918. On the other hand England cut her fire loss down more than two million dollars in one year. In New York City alone there was an increase in fire loss of twelve million dollars between 1916 and 1921. Today fire loss in New York City alone equals the total fire loss of Great Britain. Statistics for Chicago show an increased loss of one million dollars a year.

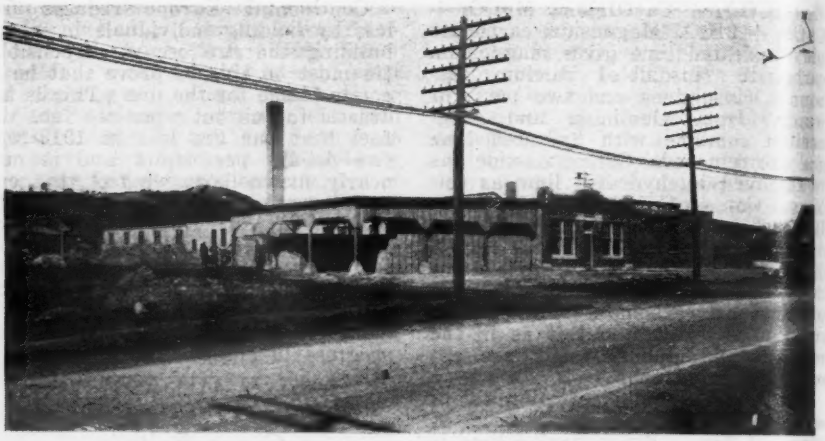
The explanation of our apparent indifference to the seriousness of the problem lies in our attitude toward insurance companies. We carelessly assume that the insurance company will take care of the loss and we pay no further attention to the matter. Insurance companies do take care of the loss but they also determine the rates of insurance that we shall pay. Those rates are established on the basis of liability of fire. Hence we might reduce the rates if we could reduce the liability of fire.

Continental Europe reduces fire loss by holding individuals in whose building the fire occurs responsible. He must be able to prove that he is not to blame for the fire. This is too drastic for us but when we face the fact that our fire loss in 1913 was two dollars per capita and is now nearly five dollars, we feel that our complacent indifference should be shaken off. If Europe can reduce fire loss, we can. Their methods are not our methods; their problems are not our problems but their record of achievement must not be allowed to make us ashamed of our record of progress in enterprise.

Machinery Situation in Great Britain

The international machinery trade of the world is largely divided between the producers of Great Britain and the United States. Because British manufacturers occupy such a very important position as exporters of machinery there is a tendency to overlook the large volume of machinery exported from the United States to Great Britain. Even in prewar years these exports were very heavy. In 1910 Great Britain absorbed more than $4,500,000 worth of American equipment. In 1913 Great Britain consumed more than $10,000,000 worth of such machinery, and in 1922 $12,791,732 worth. Generally speaking the machinery exported to Great Britain from the United States represents our better class of equipment. The volume of industrial machinery imported by Great Britain is large, being about $21,500,000 for 1922. The United States furnishes nearly two-thirds of these imports.

A certain amount of this machinery that is imported by Great Britain is re-exported, but this trade is very much less than formerly. The British machinery industry now finds itself confronted with a rather serious problem. It is normally recognized there that the engineering industries depend on foreign markets for about 50 per cent of this business. In pre-war years a very large percentage of this equipment went to continental Europe. Conditions in Russia, Poland, Germany, and some of the other European countries have had an adverse effect on this trade, which may be expected to continue and restrict this trade for some time to come.



General View of Plant

Wisconsin Concrete Brick Plant Increases Production

The Shope Brick Company of Wisconsin Sold 3,000,000 Bricks in 1921; in 1923 they sold 6,000,000, and judging by This Rate of Increase, Sell at Least 8,000,000 in 1924.

THE GROWTH of the Shope Brick Company of Wisconsin is one of those phenomenal achievements which have made the development of the resources and the opportunities of this country so unique.

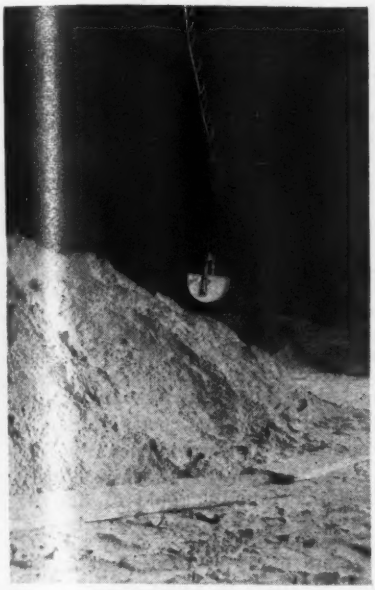
This is another story which reads more like a romance than a statement of business progress. During the first year of its existence this plant turned out more than three million bricks. Last year they sold more than six million, and this year they will have to turn out more than eight million if they are to keep pace with the enormous demand for their product. And all of this since March, 1921, when the Shope Brick Company of Wisconsin first began to manufacture.

The plant is a single story structure, 250 ft. x 110 ft., including the office, boiler room, kiln room, cement storage room, sand shed, brick storage shed, and work room. It is built of concrete and concrete brick. At present it is equipped with twelve hand tamping machines. The capacity of the plant is 50,000 common bricks or 20,000 face bricks a day. There is plenty of room for expansion, as the company owns 5½ acres of land. The shipping facilities are ideal, as they have a siding on the Chicago, Milwaukee and St. Paul Railroad and can transfer to the Chicago and Northwestern Railroad without charge.

Source of Material Used

The gravel is at present secured from the Waukesha Washed Sand & Gravel Company, but it is easy to prophesy that it will not be long before the Shope Brick Company of Wisconsin will operate its own pit. All Shope Brick manufacturers realize that it is desirable to control their supply of sand and gravel. The Arundel Shope Brick Company of Baltimore, Maryland, is a typical example of what a Shope Brick manufacturer can do with his own pit. The story of this plant appeared in PIT AND QUARRY for November, 1923.

The gravel used is washed and screened by the Waukesha Washed Sand & Gravel Company and sent by rail to the plant. This gravel runs from ½ down to good mason sand. The sand is conveyed from the car by means of a Northern portable conveyor into the sand shed, which is a building 30 ft. x 150 ft., built adjacent to the main plant. This portable con-



Interior View Showing Sand Conveyor.

veyor has made it possible to unload a car of material in four hours. Formerly, two days were required.

Sand is carried to the hopper by a conveyor moving over elevated tracks. This conveyor is raised and lowered by chains. This feature is one of the recent improvements of operation. From the hopper the sand travels on a belt conveyor to a 9 cu. ft. Blystone mixer. The cement is brought from the cement storage bins to a hopper located just above the sand hopper, from which it is conveyed to the mixer by a belt conveyor.

A day's supply of cement is usually stored around the hopper. One man takes care of the material at the mixer. The mix is 5-5½ to 1. He first loads the mixer and then dry mixes for two minutes, after which the material is dumped onto a conveyor. This conveyor is raised and lowered by chains. The conveyor is then transported over elevated tracks to bins alongside the brick machines and emptied. These brick machines are on both side of a central platform that runs from the mixer. The elevated conveyor tracks run above and on each side of this platform so that the material from the mixer can be routed down either row of machines.

Molding the Bricks

The brick molds are filled by the machine operator from the bin at his side. The bricks are tamped, surplus material struck off, and the face of the brick sprinkled with water and neat cement.

This is sufficient for the common brick. For face brick it is necessary to mix color with the cement. Coloring matter is also sifted onto the face of the brick, the brick flushed with water and the color pounded in with special brushes. The coloring matter is iron oxide. Many designs of facing can be obtained, such as moss, tapestry, stipple, smooth or rough.

Self-Spacing Pallets

After the bricks have been smoothed, they are put on a self-spacing wooden pallet. This pallet is a board with a metal top and is inserted as a bottom plate before the bricks are made. It is constructed so that one batch of bricks can be stored over the other. Two blocks a little large than the

Typical Example of Shope Brick

bricks are placed under either end, and as the pallets with bricks upon them are piled up, they are so spaced by these blocks that the top pallet does not rest on the bricks. This is the self-spacing feature.

As the bricks are manufactured, these pallets, which hold ten bricks, are taken out and piled nine rows high, making a stack of 90 bricks. A truck made by the Shope Brick Company picks up these stacks of bricks and a man runs them into the kiln. This truck goes under the bottom pallet, picking up the stack easily and without any jar. The trucks that do this hauling have two wheels with rubber cushioned tires so that the bricks are in no way disturbed in their initial set. The common bricks are left in the kiln 24 hours, while the face bricks are left for 48 hours.

The Brick Storage

The bricks are removed from the kiln, after being properly cured, to the storage yard by regular trucks. There are three kilns built of concrete bricks, two 46 ft. x 23 ft., and one 40 ft. x 23 ft. The roof is gabled so that the moisture in the kilns will run down the slanting slope of the roof to the side walls and down to the floor. All danger of the moisture dropping onto the bricks and injuring them is thus removed.

Curing the Bricks

Steam is introduced into the kiln through a small, perforated steam pipe running in trenches on the floor. At frequent intervals steam is released and a smoke-like vapor spreads throughout the entire kiln and cures the brick in the very short period mentioned, namely, 24 hours for common bricks and 48 hours for face bricks.

After the bricks have been cured in the kilns, the doors are opened in summer and heat turned on in winter until they are dried by the aid of a powerful circulating fan.

The bricks, after five days, are carried to the brick storage yards, which are under cover. Here they are removed from the pallets by hand and stacked in piles. These piles are supported by heavy planks and are ready for shipment.

Popularity of Shope Bricks

Practically every architect working in this company's field of activity is availing himself of the opportunity to use Shope brick. They are carrying out many new designs of finish and blending of color scheme. They have brick in homes, stores, garages, office buildings, flats, churches, schools, etc., and the sewage commission of Milwaukee use them for sewer construction.

Organization of Shope Brick Company

The Shope Brick Company of Wisconsin was incorporated January 5, 1920, for the purpose of manufacturing Shope concrete, face and common brick under the protection of the

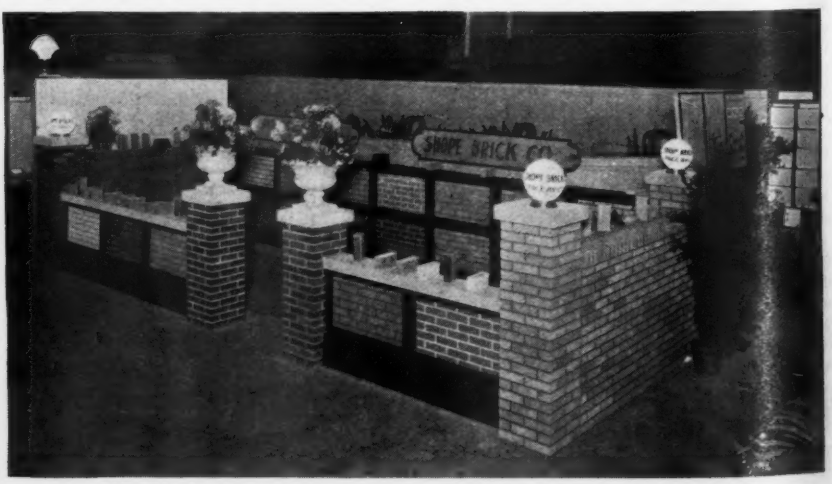


Exhibit of Shope Brick at Home Exposition.

Shope patented machinery and patented process for water-proofing concrete. Plant construction was commenced on August 14 of that year. The immediate and unprecedented demand for the brick has resulted in the rapid development of the organization, and today they have one of the finest concrete brick plants in the country.

J. S. Barber, as general agent for the Shope Brick Company of Portland, Oregon, promoted the company and was its first secretary and general manager. The present officers are J. J. Tadych, president, Michael Schmidt, vice-president; P. J. Shulteis, secretary, treasurer and general manager; and G. L. Diedrick, office manager and accountant. The plant represents an investment of $200,000. The company owns the right to manufacture for Kenosha, Racine, Milwaukee, Waukesha, Ozaukee, and Washington Counties in Wisconsin.

Fire Resisting Brick

The Shope Brick Company of Wisconsin are producing a brick that has fire resisting qualities which make it unequalled. This brick has been put to the test and has proved its superiority. It is attractive and highly suited to ornamental construction. The colors which are available in this product are as durable as the brick itself, for they have been subjected to fire and water in order to prove their stability. The process of manufacture is simple and rapid, and the result is a perfect brick produced in a very short time.

It is these facts that have made the Shope concrete brick so successful, and this demonstrated success and superiority are the reasons why large corporations such as the Shope Brick Company of Wisconsin are manufacturing bricks under the Shope patents.

Cement from Philippines

Cement from the Philippines is to be placed in competition with the American product. The steamer Pawlet, now at Cebu, is taking on a shipment of 1,000 tons of the Philippine product and this shipment is to be followed by others, according to advices received at the offices of the Columbia-Pacific shipping company at Portland, Ore.

Find Gold in Gravel

Gold has been discovered in the gravel obtained from the river at the plant of the Atlas Rock Co., Oakdale, Calif. "Pay dirt" deposited in barrels for test purposes was recently carted away by thieves, who left but one barrel. The concentrates of the remaining material will be examined, however.

Geological Survey reports production of Portland cement totaled 10,370,000 barrels in March, 1924, against 9,880,000 in March, 1923. Shipments in March totaled 8,995,000 barrels, against 10,326,000 last year, while stocks at end of March totaled 18,190,000 barrels, against 13,045,000 at end of March, 1923.

General View Looking Into Storage Bins.

(Continued from page 96)
eral hydration tends, I think, to smooth out the differences in types of lime. The question of getting a higher CaO content in the hydrate is very interesting to me, as, if we can get rid of some of our silica and alumina content by hydration, it means that my firm can tackle the chemical demand. As far as we have gone, however, the silica and alumina seem to be in too intimate association, a point we claim for our mortar lime.

Our plants, except chemical, are very far behind your own. When one is entirely dependent upon such a fluctuating trade as our building trade, it requires a good deal of courage to put down large amounts of capital, in fact, it is not justified.

The common type of kiln is the direct feed shaft employing coke. Coke is now, however, far from being the by-product that it was before the war, and is becoming more expensive than coal, so that gas kilns will become more general. We have an excellent gas kiln in the Priest which by employing preheating and waste heat boilers obtains a fuel ratio of 6 and sometimes nearly 7 to one.

With our greatly increased labor costs, we are having to give much more thought to labor-saving equipment. In our labor, we are more fortunate, I think, than you are. The cost is nearly double what it was before the war, but our labor has come to realize that there is a limit to what can be taken out of industries in wages, and that it is an easy matter to kill the industrial goose that lays the wage egg. Practically all of our industries make six-monthly agreements with the workers' representative based upon the Government cost-of-living figure, and the operators are always ready to look at the manufacturers' side of the question.

These represent the chief points of comparison which I have so far noticed. I must, however, take this opportunity of expressing my gratitude for the very great kindness that has been shown me. Nothing that could make my visit more interesting or more pleasant has been too much trouble. I shall go back, not only with a very greatly increased knowledge of lime manufacture and a valuable addition to my business education, but also with the very warmest remembrances of that more personal order which make life so pleasant.

Production of Stone

About 107,200,000 tons of stone, valued at $161,600,000, was produced in the United States in 1923, according to the Department of the Interior, an increase of about 34 per cent over 1922 and of nearly 17 per cent over 1916, the largest recorded output. The estimated total value is 32 per cent greater than that for 1922 and is the largest on record. There was fairly active demand throughout the year for all kinds of stone, and working conditions in the quarries were better in 1923 than in 1922.

Big Demand for Cement

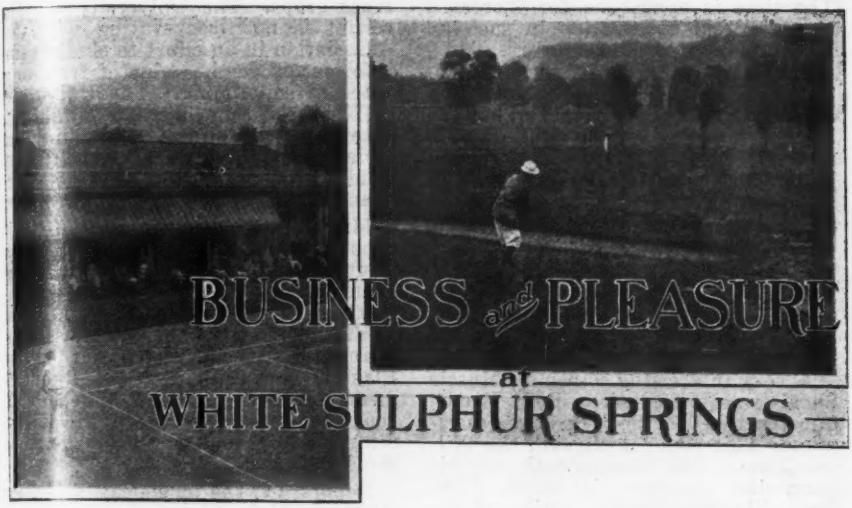
There has been an exceptionally great demand for cement, and no let-up in the buying is in sight. Some of the large makers have been refusing business for the past six or seven weeks, because they have sold out production for a long time ahead.

The cement subsidiaries of the United States Steel Corporation, which are now producing at the rate of about 15,000,000 bbls. per annum, have been out of the market for some time, and the same is true of other large makers. It is estimated that orders for cement for road work placed in recent weeks have reached a total of between 5,000,000 and 6,000,000 bbls.

Safest Plan Praised

Recognition of unusual precautions for the safety of workmen in the plant of the San Antonio Portland Cement Company came recently in a telegram to Charles Baumberger, president, from William M. Kinney, general manager of the Portland Cement Association, reading:

"I take great pleasure in informing you that your plant has won the association's safety trophy for 1923. There is an additional honor in winning the trophy the first time. You and your men have set an example which will be of immense value to us in accident prevention work. Rules governing awarding of the trophy contain this clause: 'The trophy shall be awarded to the winning plant at each spring meeting of the association. It shall be presented to two delegates chosen from the employes at the plant and all expenses of these two men in attending the spring meeting shall be paid by the association as a part of the prize.'"



Technical Control of Lime Dominating Theme at Lime Convention

The Sixth Annual Convention of the National Lime Association has just ended. It was held at White Sulphur Springs, West Virginia, from May 20th to the 23rd. It brought together a distinctive group who are giving serious attention to an important phase of industry. The convention was unique in that the sessions were so planned that the afternoons could be devoted to recreation. This was an attractive feature in a place which offers such excellent opportunity for enjoyment.

The business sessions showed clearly that there has been a marked increase in the technical control of lime manufacture. During the past year, there has been a notable influx of technically trained men. There is much evidence of an increase in the use of lime in the chemical industry. The laboratory research of the association during the past year has been concerned with the quick setting lime plaster properties of quick lime and the analyses of lime and lime products.

As a result of the fellowship research program, more than thirty men outside of the lime industry, are engaged in chemical lime research. The use of lime as a catalyst in the manufacture of organic compounds, is being extended. The manufacture of acetone from acetic acid and the preparation of benzoic acid from benzol chloride, are two of the new applications of lime in industry. Substitutes for platinum catalysts made from mixtures containing lime with other metallic oxides, are being used satisfactorily in the oxidation of ammonia. There is a promising field for lime in the manufacture of methol from methol chloride by the use of granulated calcium hydroxide.

On Tuesday, May 20th, at ten o'clock, the convention was started by a meeting of the board of directors. At eleven thirty, the members gathered to listen to the opening address by the President, Mr. George B. Wood. Mr. Wood pointed out that the work of the Association is recognized as worth while and constructive. He emphasized the need of cooperation in the program of "educating more uses to use more lime." His plea for a fine spirit of good fellowship among competitors whose interests are similar and whose cooperative effort will accomplish much, was inspirational and voiced the general tone of the conference. The situation in building construction at the present time indicates the increasing demand for the products of the lime industry.

The time is opportune for increased strength and cooperation in such an Association of manufacturers.

Mr. Burtan A. Ford, general manager, presented his report following Mr. Wood. The association has an income of over $100,000 available for national work. The staff at Washington has been actively employed in writing bulletins, reviewing many articles appearing in the trade press, commenting upon the member companies advertising, participating in the work of scientific organizations, supervising a large number of important fellowships as well as conducting research.

A very interesting paper on Muscle Shoals was presented by R. P. Brown Construction Engineer for the Association. This paper dealt with the Wilson Dam. The total length of this composite structure is about 4,500 feet. The powerhouse section of the dam is 1,250 feet long. The spillway section is 3,050 feet long while the lock section is 200 feet long. A total of 1,291,384 cubic yards of concrete will be required. During the early part of the work some concrete was placed without the addition of hydrated lime but difficulty was encountered so tests were made with hydrated lime.

At first an addition of 2 per cent by volume was used, but this proved to be far from sufficient, and so the addition was raised to 5 per cent by weight. With this addition of hydrate of lime, the concrete has been entirely satisfactory and an inspection of the work shows entire freedom from segregation, honey-combing, etc. The hydrated lime notably increased the workability of the concrete and had no dilatorious effect upon the strength when used as recommended.

In the afternoon, the golf tournamen was opened. The weather proved to be a handicap that a good many members evidently failed to overcome, and an auction bridge party was held in the evening.

On Wednesday morning the session opened with a report of the agricultural activities by R. C. Towles, Soil Technologist for the Association. This department has recently published in bulletin form, an article showing the part lime plays in animal nutrition. A bulletin will soon be off the press dealing with the use of lime in controlling insects, affecting garden and truck crops. The University of Wisconsin is now cooperating with the Association in an effort to obtain some information on the value of fractional rates of soil liming. The University of Nebraska now has a fellowship to determine the effects of liming materials on the physical structure of solid, with particular reference to granulation.

Mr. R. P. Brown next presented his report on the construction activities. Four entirely new bulletins have been issued this year. They are Lime, Liming Cement and Brick Mortar, Whitewash and Cold Water Paint, Standard Specifications for Lime Plaster, and Building Code Requirements for Lime. A new bulletin will soon be issued on the subject Hydrated Lime Makes Concrete More Workable.

Report of the chemical activities by G. J. Fink, Chemical Director of the Association, was presented following Mr. Brown's report. The work of the Chemical director is concerned largely with investigation, promotion, and service. This department is studying lime from a physical and chemical point of view. Considerable experimental data on the reactions of lime with gases such as carbon dioxide has been collected. Much progress has been made at the Ohio State University on the use of lime in the treatment of sewage and trade waste. The research work at the Massachusetts Institute of Technology, has proven of much value in explaining certain properties of lime The work of the James Millikin University has demonstrated the value o lime in the textile industry. Th preliminary data indicates that ther has been an increase in the use o lime in the chemical industry in 192 of approximately 12 per cent ove 1922. Dr. W. H. McIntyre in hi work at the University of Tennessee has developed facts and data dealing with the reactions between lime, aluminum, iron, sulphur and silica, which will have an important bearing on the chemistry of Portland Cement, limes, and plasters of all kinds.

In addition to these relationships, the department has cooperated in investigational work with a number of institutions, laboratories, and individual manufacturers. A chemical hand book is being prepared under the direction of this department, to serve as a companion of the construction hand-

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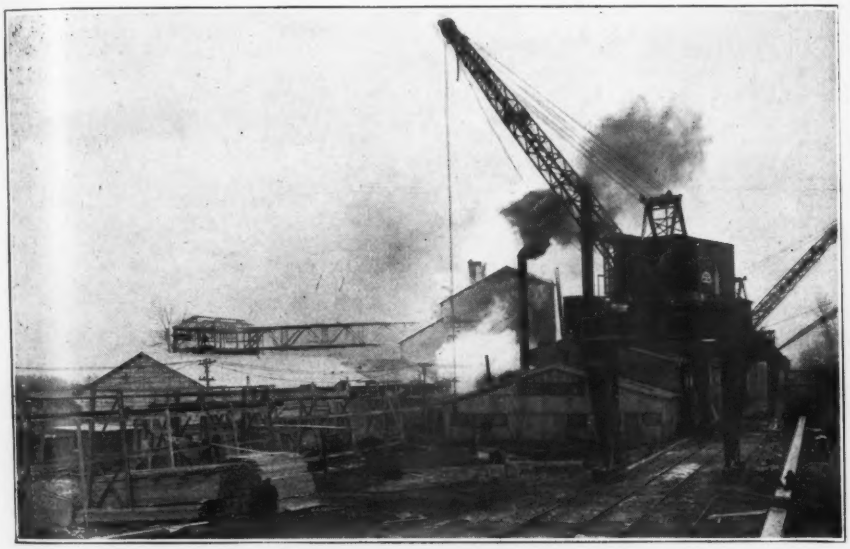


One O. S. Dependable Crane Sells Another

At the U. S. Gypsum Plant, Genoa, O.

When the U. S. Gypsum Co. began enlarging and improving their Genoa plant in January a new O. S. Dependable Crane was one of the pieces of equipment added.

The Genoa plant had been using one Electric Gantry O. S. Dependable Crane and the performance of this machine was the deciding factor in the decision favoring another O. S. Dependable Crane. That's a good way to buy a crane, and it is the way many O. S. Dependable Cranes are purchased—by getting the facts in actual plant operation.

If you are not fully acquainted with what O. S. Dependable Cranes are doing and can do under conditions similar to yours, we will be glad to get the information for you. Just drop us a card stating your requirements and the information you want.

ORTON & STEINBRENNER CO.

608 South Dearborn Street **CHICAGO, ILL.**

O-S DEPENDABLE

book. Several chapters of this handbook have already been prepared. A bulletin will soon be issued on water treatment, describing briefly the problems of water purification, the various processes used, and the various uses of lime for this purpose. Definate steps have been taken for the publication of a text book of lime.

Mr. Gordon Willis, President of the Peerless White Lime Company, presented an inspiring paper "Grow or Go". This paper was illustrated by pictures taken at their plant, showing the underground mining of limestone. Mr. Willis recommended that a production department and a traffic department should be incorporated into the organization of the National Lime Association. The Peerless White Lime Company has studied the problem of fuel in lime buring. Production of their plant has incresed and at the same time, the fuel cost per ton of lime has decreased, as a result of this study. This increase is brought about by changing the firing periods, methods of firing, and the frequency draws. Mr. Willis believes that a company that grows must take advantage of the opportunities that are presented to reduce labor costs, fuel costs, repair costs, etc.

Mr. L. B. Burt, Clerical Representative, Central Division, presented a paper entitled "The Rcent Survey of the Paper and Pulp Industry in the Southwest." Mr. Burt was the only field man of the Association in attendance, and this paper was a complete survey in every sense. Many figures were presented to show that there is a big field for lime in the production of paper.

Mr. W. H. McIntyre, head of the Department of Soil Chemistry of the University of Tennessee, presented a very significant talk dealing with some new lime compounds, and their possible significance in the lime industry. The study of iron-alumina has developed some new compounds. When iron-oxide is mixed with lime, a chemical compounds results. Alumina is a constituent probably never absent, except in the high grade commercial lines. By adding lime to the alumina, calcium aluminate, which has been a very indefinite product, is secured. Mr. McIntyre is the first one to make calcium aluminate by synthesis, actually isolating and photographing. By adding calcium sulphate to a product of lime and aluminum oxide, a material Mr. McIntyre calls "calcium alumina sulphate" is secured. It consists of three particles of lime, one particle of aluminum, three particles of calcium sulphate, with three parts of water for crystallisation.

On the evening of Wednesday, a research conference was held that was attended by lime technical men, plant chemists, and superintendents. A list of suggestive questions prepared by the staff at Washington, served as a basis for discussion. Considerable of this discussion centered on the question of the determination of available lime and colloiddal content. The afternoon of this day was again devoted to golf. Tennis and quoit tournaments were also gotten under way.

Thursday morning, a report dealing with the lime plaster investigations, was presented by G. J. Fink, and J. E. Underwood, who is assistant to Dr. Fink.

Mr. W. A. Freret, Consulting Engineer of the National Lime Association, presented a report on the investigations conducted at York, Pennsylvania on the lime building block. Mr. J. W. Stockett has been working with Mr. Freret on this work. They have actually produced a lime block intended to serve as a regular title block. This opens up a new field for the use of lime. This block has more than satisfied the A. S. T. M. specifications with regard to compression, absorption, and weight.

Mr. Ferguson, a fellowship student of Ohio State, presented a paper on behalf of Mr. J. R. Withrow on lime in the treatment of trade waste. This paper showed that unusual processes had been made in the study of this problem. PIT AND QUARRY is pleased to reproduce this paper in full in this issue.

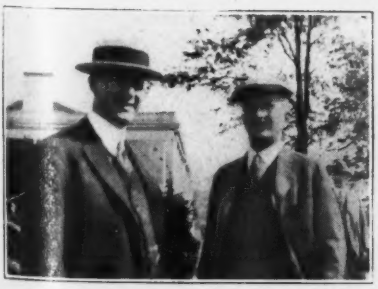
Mr. W. R. Phillips, General Manager of the American Lime and Stone Company, discussed mining limestone and the operation of a rotary kiln. This talk was illustrated and proved of much interest to the members. Mr. Phillips demonstrated his willingness to cooperate by answering rather pertinent questions on the problems at his plant.

Dr. R. H. Haslam, Directory, Laboratory of Applied Research at Massachusetts Institute of Technology, presented the results of the investigations conducted at M. I. T. in

Camp Hitting Them Out

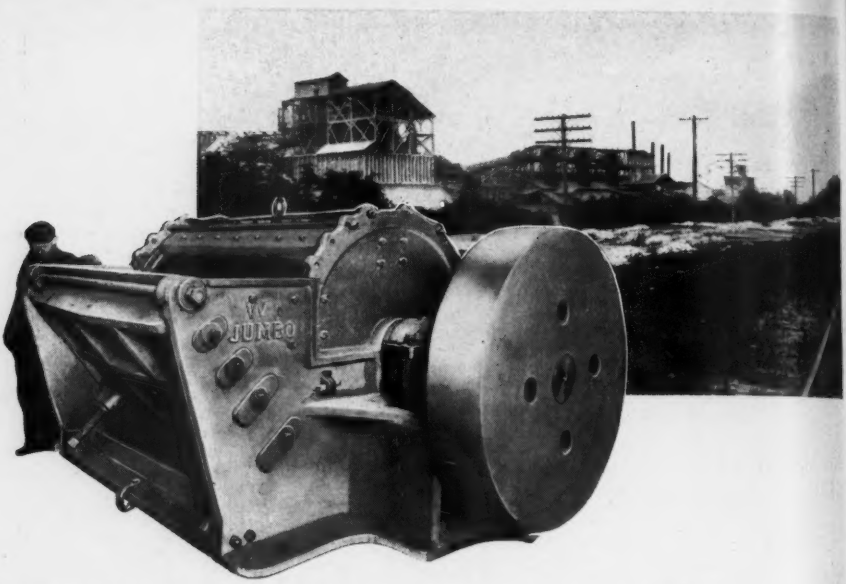
Watching Wood Top It

Most of Those Present



W. R. Phillips Charles Warner

J. K. McLanahan C. W. C. Cobb



Dittlinger Lime Co., Installs Their *Second* Jumbo Crusher

Williams Hammer Crushers Adaptable to Every Crushing Operation

Cement "Not excelled by any other type of crushing machinery."
Riverside Portland Cement Co., Riverside, Cal.

Lime "Establishing a remarkable record."
Luckey Lime & Supply Co., Luckey, Ohio.

Macadam "Supplanted gyratory and jaw crusher, and product is superior."
E. H. Bradbury, Kansas City, Mo.

Agricultural Limestone "Paid for itself in four months time."
Otto Orth, Webster Groves, Mo.

Asphalt Rock "Using Williams crusher on asphalt rock since 1905 with greatest success."
Continental Asphalt & Petroleum Co. Dallas, Texas

This prominent plant at New Braunfels, Texas, was so well pleased with their first Williams crusher that they later installed a second and larger machine with a capacity of 100 tons per hour of 2½" macadam. The "Jumbo" crusher as installed will reduce rock as large as 16" to macadam and in many cases has replaced two smaller ratio crushers as well as extra conveyors, drives and elaborate buildings. First cost is less, crushing cost lower and plant operation simplified.

Unequalled for Macadam and Agstone

Any size stone, from agricultural size to unusually uniform macadam can be made with the "Jumbo" simply by changing the grates. If you have rock to crush, any size to any fineness, write us.

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Williams

PATENT CRUSHERS GRINDERS·SHREDDERS

a paper. "The Solubility of Commercial Limes." The object of this investigation was to make a study of the solubility of commercial limes in water and in a solution of various substances. Before results could be obtained regarding the rate of solubility, it was necessary to collect data concerning the ultimate solubility of different types of limes. For this purpose three limes were chosen, having the following chemical analyses:

A—High CaO; Low MgO Low SiO_2
B—High CaO; Low MgO High SO_2
C—Low CaO; High MgO Medium SiO_2

Solutions of these limes were brought to equilibrium with solid lime at 25 degrees C. and samples analyzed for caustic strength and for calcium hydroxide contents. In all cases, the alkalinity was higher than given by data for pure CaO. At the same time, the calcium content was lower, showing that there was a small amount of the sodium hydroxide in the lime which went quickly into solution, thus altering the solubility appreciably.

In connection with this research, an investigation of the literature was carried out to collect all available data on the solubility of $Ca(OH)_2$ in solution of various substances. The effects which these substances have upon the ultimate solubility of $Ca(OH)_2$ may be summarized as follows:

1. Bases greatly decrease the solubility, especially at high temperatures.

2. Salts which are acidic in nature, greatly increase the solubility of $Ca(OH)_2$; in dilute solutions of these substances, increase of temperature causes decrease in solubility, while at high concentrations of salt, the solubility is increased by increasing the temperature.

3. Organic substances such as glycerine and cane sugar, greatly increase the solubility, especially at high temperatures. All of the data collected has been corollated by applying Lewis and Randall's "Theory of Mixed Solutes," which makes it possible to predict with fair precision, the solubility of $Ca(OH)_2$ in certain circumstances, for which no data have been recorded.

The experimental work which is now in progress, is aiming to show the quantitative effects of various factors upon the rate of solubility of lime. Some of the variables being studied are stirring, fineness, temperature of solation; and temperature of burning of lime.

On the afternoon of this day, the finals of the golf tournament were run. A baseball game was indulged in—the Eastern Division opposing the Central Division. The finals of the tennis and quoit tournaments were also run off. In the evening a dinner and entertainment was given by the Valve Bag Company of America at Kate's Mountain Club.

On Friday morning, a joint session of the National and Divisional Organization was held, and the dominating theme here can be very well summarized in the words of Mr. G. B. Arthur, who urged the organization to do "more and more work of the same kind." All the present officers were reelected at this time, and the business session was closed by a meeting of the Board of Directors.

The National Lime Association can be justly proud of its accomplishments. They are doing much to increase the market for their own products, and at the same time being of increased service to the public. This convention clearly showed that there was a steadily increasing support being given the National Lime Association. Such work will certainly be rewarded.

The name of the Ft. Wayne Cement Stone Company, Ft. Wayne, Ind., has been changed to Jacquel-Schulz Company.

At the Casino

Much Demand for Material in Kentucky

Road Building Quite Heavy, Also Dam Building, Many Contracts Let

By Our Louisville, Ky., Correspondent

AMONG the outstanding features in bluegrass doings, road building contracts and road bonds hold the center of the stage. One bond issue to be voted on this fall involves $50,000,000 for road building, and there is also an organized fight against it, which makes it a live issue.

Meantime a lot of road contracts previously let have been declared void because the highway board exceeds its authority in letting contracts beyond its own tenure of office. Meantime, however, road building is going forward at a good rate and those contractors having quarries in connection with contracting are very busy.

Also there is a goodly share of dam building in the state. The biggest project is the Dix River Dam, which is making rapid progress, but there are other dams in contemplation and government work on the Ohio River Dams is going along, and attracting some new contracts.

Some of the low bidders for contracts connected with the Ohio River Dam work by the government are the American Hoist and Derrick Co., St. Paul, Minn., and the Dravo Contracting Co., of Pittsburgh, got a contract for five manoeuver boats and derricks.

Among the cement contracts awarded in connection with government dam work were the Kosmos Portland Cement Co., Louisville, 40,000 barrels for Addison, Ky., and the Atlas Portland Cement Co., Chicago, 35,000 barrels, for use near Owensboro.

Building operations for the spring months in Louisville have broken all record, making over 9,000,000 for the first three months and more than 4,500,000 during April, with another splendid showing rolling up in May. And in addition to all this there is sewer and street work making a splendid demand for sand and gravel. The river sand people not only have a big local demand but also a fair volume of carlot trade out in the state.

In addition to the river sand and gravel work, sand pits in Louisville are also doing very well.

River Tonnages in Pittsburgh District

Many Concerns Engaged in Peak Production. Prices Maintain at Uniform Levels, and Future Prospects Are Good

By Our Pittsburgh Correspondent

ACTIVE operations continue in the sand and gravel industry at Pittsburgh, Pa., and diggers are developing large tonnages from the Monongahela and Allegheny Rivers, with a ready market in the city and neighboring districts. Incoming business remains satisfactory, and the prospects for future demand good.

The price situation remains uniform, good washed gravel maintaining at $1.60 a cubic yard at the waterfront, f. o. b. float, and $2.00 delivered on the dock. At the retail yards, the figures vary to $3.00. River sand continues to parallel quotations for gravel, with dealers asking $2.40 and $2.50 a cubic yard, on the job, higher for longer hauls. Crushed stone is being sold, wholesale, at $2.85 a cubic yard, carload lots. Portland cement shows no change from $2.19 per barrel, less bags, cargo shipments to dealers and contractors.

Pittsburgh Federal engineers have issued a report for river tonnages for April, covering traffic on the Allegheny, Monongahela and Ohio Rivers. The gravel record for the first noted stream shows 81,850 short tons; sand, 75,883 short tons. For the Monongahela, gravel rates at 89,686 short tons, and sand at 89,085 short tons; and for the Ohio River, gravel, 55,583 short tons and sand, 59,354 short tons. The same office has also compiled its annual statement for the past year, showing the aggregate tonnage of different materials on the three rivers for the twelvemonths period.

The total tonnage of all stocks was 7,286,005 short tons, with valuation placed at $51,866,812; this is an increase of 2,373,618 short tons over the year 1922, considered a record period. Coal continues as the main commerce transported on the streams, representing 69.4 per cent of the total. Gravel represents 8.4 per cent of the aggregate, and sand, 10.2 per cent.

The Pittsburgh Sand & Supply Co., Pittsburgh, has developed facilities in recent weeks for maximum output and distribution. They look for a big year.

Production Keeps Pace With Increasing Demand

All Producers Actively Engaged and Making Improvements to Increase Production

By Our Special Correspondent

THE SUMMER demand for cement bids fair to rival the spring demand, and mills in the Lehigh Valley district of Pennsylvania, therefore, are looking for no lull in operation. Practically all of the leading plants are still running full, shipping large tonnage to eastern and near-south destinations for immediate account.

General contractors, building supply dealers and state highway departments are the primary pivots from which current call issues and the material yards continue to place unusually good business. Connecticut business for highway construction is another feature, about $4,000,000 being invested in new hard-surfaced roads in this state.

The railroad situation gives no immediate cause for complaint. The roads, evidently, are doing their best to keep up with the requirements of the different mills. Motor trucks, as usual, carry their share of the burden.

A mill base of $1.95 per barrel in carload lots to contractors and dealers is current, with no indication of immediate change. Under the present rate of call, however, an increase at the Pennsylvania mills may be determined on short notice.

Frank H. Smith, president of the Lawrence Portland Cement Co., with mills at Siegfried in Northampton County, believes the industry is in position to meet all demands made upon it, notwithstanding the heavy construction programs being advanced throughout the eastern district. He points out that during the last few years, cement producers have been called upon to produce an increasing amount of cement annually, and have always met the demand. Mr. Smith says that the Southern States have relied heretofore upon the Lehigh Valley and Hudson River Districts for their supply of material, but now several plants in the south will supply their own markets; this will ease greatly the demand upon the northern mills in the localities mentioned—yet it has been necessary for the Lehigh Valley mills to add a number of kilns and manufacturing facilities to be in position to meet the prophesied demands for the coming year. Stocks of finished cement in April, ready for shipment at the mills, was larger than at any time last year.

The Atlas Portland Cement Co., Northampton, Pa., is continuing active production at its local mills and large shipments are leaving the plant daily. The company is said to have booked large advance orders. At a recent meeting of stockholders, the capital of the company was increased from $25,000,000 to $30,000,000, for such expansion as may be necessitated.

The Lehigh Portland Cement Co., is another active producer in the Eastern Pennsylvania field, and its mills at West Coplay and Fogelsville, as well as the No. 3 plant at Ormrod are running under heavy production programs. Full working forces are employed. The company is booking heavy business ahead.

This company has filed a complaint with the Interstate Commerce Commission charging "unfair, unlawful and prejudicial discrimination in freight rates" in the southwest territory and at port terminals, against practically every carrier east of the Mississippi River, and sets forth that for several years these carriers have been exacting transportation charges on products shipped from its mills at rates higher than those charged competitors.

Two new barges, each 90 ft. long and 18 ft. wide will be added to the company's fleet.

The Keystone Sand & Supply Co. is transporting heavy tonnage of material on the river, and has also recently added to its Point Landing an all-steel hopper. They are proceeding with the new landing at their McKeesport plant for unloading service.

The Rodgers Sand Co. is continuing operations under peak conditions, their river fleet bringing large tows into the Pittsburgh port for immediate distribution. The dredge "Flora" is going into service on the Ohio River for sand and gravel production, and the "Rebecca," recently rebuilt, will also be put in active service.

The Iron City Sand Co. is continuing its usual heavy production and distribution of sand and gravel.

Railroad Legislation Now Before Congress

Act in Restriction of Interstate Commerce Commission Passed by Senate and Bill Providing for Settlement of Labor Disputes by Mediations Is Under Consideration. Cement Tariff Urged.

By Our Washington Correspondent

THE GOODING bill, restricting the Interstate Commerce Commission in its application of the long and short haul clause of the interstate commerce act, has been passed by the Senate. The bill is the first important one on railroad questions to be passed at this session by the Senate and marks the first step forward toward concluding a fight carried on for more than 20 years by the intermountain rate territories. The Interstate Commerce Commission has for years maintained its power to permit a common carrier to charge less for a long than for a short haul included in the long haul when the carrier has shown after public hearing that such authority is necessary for the maintenance of its service. The measure passed by the Senate would permit "departure" only in the cases of circuitous routes, in the making of export and import rates and with regard to block express rates.

Another railroad bill before Congress is the Howell-Barkley bill. The original bill provides for elimination of the Railroad Labor Board and a settlement of all railroad labor disputes by mediations. As amended by the Senate, the bill provides that in a strike or lockout, which the President considers may result in a transportation crisis, he shall at once instruct the Attorney General to file suit for a receiver who has no financial connection with the railroad.

A tremendous pressure is being exerted at the Capitol to secure enactment of this bill. In addition to being considered as an opening wedge in the destruction of the Transportation Act, the radical element is concentrating on getting the bill through the House and the Senate before the political conventions in order that President Coolidge may be compelled to put himself on record as to his attitude toward the Railroad Labor Board, which is opposed by the big railroad labor unions. The strongest weapon of the opponents of the bill is the charge that it would increase already excessive Government machinery, the salaries of the members of which exceed the total salaries of the President, the Vice-President, the entire Cabinet, the entire Supreme Court, the President of the Senate, and the Speaker of the House.

Reports to the National Sand and Gravel Association headquarters here indicate that car loadings this year are running much heavier than a year ago. Apparently little difficulty is being experienced by producers in obtaining cars and products are moving with greater or lesser regularity. Some producers, however, are having difficulty with their particular carrier in getting the kind of cars they want. Here is a complaint a Southern member sent to the Washington office and the reply of the office:

"For sometime the Atlantic Coast Line has been furnishing us with low-side flat-bottom A. C. L. gondola cars. We have been notified by them several times that we could not load these cars to points off of their lines. We have paid no attention to these notices for the reason that they have been furnishing us a great part of the time with nothing but these cars, or at least a large percentage of our car requirements are filled with these particular cars. We are in receipt today of another notice from them as follows: 'Again we wish to call your attention to the regulations governing the loading of equipment. It being very essential that A. C. L. cars be loaded to points on line, intra cars are to be used for movements destined beyond our rails and must not be used for local loading.'"

The reply reads:

"There is nothing in the Car Service Rules which permits a carrier to restrict members in this way. If the Coast Line furnishes nothing but A. C. L. cars, then such cars may be loaded to off-line points, regardless of protests from the local agents. If other members are having difficulty similar to that related above, it is suggested that they advise the car distributors of the lines serving their plants, from 12 to 24 hours in advance if possible, of their car requirements for the following day, giving destinations of shipments. If any shipments are destined to off-line points, then a specific request should be made for a car belonging to the carrier which

makes final delivery. For instance, in the case of a shipment originating on the Coast Line and consigned to a point on the S. A. L., a car belonging to the latter railroad should be requested. If, notwithstanding this specific request, the originating carrier furnishes only cars belonging to itself, then such cars may be loaded to off-line points. Protests against this practice from the local agents are not supported by any regulations of the American Railway Association and they should be so advised. The Executive Secretary will be pleased to be advised if he may be of assistance to any member who is being restricted in car service."

Southern California cement manufacturers through the Los Angeles chamber of commerce have entered protest with President Coolidge and the federal trade commission against duty free importation of foreign cement at Los Angeles harbor.

A telegram was sent to Washington May 8 by Frank Wiggins, secretary of the chamber, stating the manufacturers' position with regard to this competition from abroad, and asking that an import duty, sufficient to equalize the difference of cost between European and the California cement mills be imposed. Another telegram asked the California representatives in congress to assist the manufacturers.

About a year ago a severe shortage of cement existed in California. Word having gone abroad of the cement shortage, soon ships began to arrive, most of them from Sweden and Spain, bringing at first partial and later full cargoes of cement. The result has been, say local manufacturers, that the temporary shortage having long been overcome, the market has become glutted with foreign-made cement, which enters without paying duty and crowds out the domestic product.

Total importations of cement last year for the whole country amounted to 1,678,636 barrels valued at $2,964,200. Importations this year amounted to 153,732 barrels in January against 71,686 for January of last year, and 162,930 barrels in February against 20,529 last year.

The Celite Products Company, Chicago, have recently compiled a 12-page booklet describing the use of insulating material in The Rock and Clay Products Industries. This booklet contains data on the insulation of lime and cement kilns, boilers and similar equipment.

New Incorporations

The Stony Brook Sand and Gravel Corp. of Manhattan, N. Y., has been incorporated for $85,000 by G. A. Bullock, O. Fradus and L. M. Scott (Attorney, H. D. Valentine, 165 Broadway, New York).

Articles of incorporation for the California Rock Co., one-half mile east of Milo, Calif., has been applied for, and ground will soon be broken for a modern sand and gravel plant. Lee A. Frontz has organized the company, and the board of directors are Geo. M. Clark, H. R. Connor, P. C. Hanson, W. E. Hettman and L. A. Frontz.

The Drew Gravel Company of Minden, La., was incorporated recently for $24,000.

The Madison Washed Sand & Gravel Co., Milwaukee, Wis., was recently incorporated, with 400 shares of preferred stock, par value of $100 and 300 shares of common without par, by Geo. G. Brew, Robert A. Nussmer and I. M. Chicquennie.

The Mayfield Stone Corp., Gloversville, N. Y., was incorporated for $25,000 by R. S. and A. Sanibal, and J. A. Dunham (Attorney, W. H. Freeman, Gloversville).

The Belmont Crushed Stone Quarries of Philadelphia were recently incorporated with capital of $25,000 (U. S. Corporation Co.).

The American Leopard Stone Corporation of Salisbury, N. Y., was incorporated with authorized capital of $500,000 and $50,000 subscribed by M. L. Gantt, J. K. Wilhelm, C. A. Forrest and W. H. Folder, all of Salisbury, and T. J. Smith, W. L. Robbins and W. F. Moose, all of Concord.

Articles of incorporation have been filed in the secretary of state's office by the Gomez Brothers & Co., Inc., of Barre, Vt., for the purpose of quarrying, selling and manufacturing of granite, marble and other stones, building manufacturing plants, etc., with a capital stock of $10,000, divided into 100 shares, par value $100 each. The incorporators, all of Barre, are Manuel G., Fernando and Edward Gomez and Serbando Higuera.

The New Braunfels Limestone Company of New Braunfels, Texas, has been incorporated with capital stock of $50,000, by Max A. Altgelt, Adolph Henne, Emil Fischer and others.

The Bedford Mining Company, Inc., of Bedford, Westchester County, N. Y., has been incorporated to operate quarries and mines. Capital stock $110,000. Incorporator, John Hinkel, Bedford, N. Y.

The Green River Rock Asphalt Company of Louisville, Ky., has been incorporated for $1,000 by Harry N. Lukins, John P. Haswell and J. V. Prewitt.

The Providence Sand & Gravel Company was recently incorporated at Greenwood, Miss., with authorized capital of $100,000.

Allen-Bradley Bulletins

Four new bulletins issued by the Allen-Bradley Co. of Milwaukee, deal with the following subjects: Bulletin No. 600, Alternating Current Resistance Starters; Bulletin No. 640, Type H-1852, Semi-Automatic Resistance Starter; Bulletin No. 720, Type J-1552, Across-The-Line Starting Switch; Bulletin No. 740, Type J-3052, Automatic Resistance Starter.

Recent Patents

The following patents of interest to readers of this journal recently were issued from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trade-mark attorney, Continental Trust Building, Washington, D. C., at the rate of 20c each. State number of patent and name of inventor when ordering.

1,486,965. Crushing apparatus. Thomas A. Janney, Garfield, Utah.

1,487,198. Mining-machine bit. Newton K. Bowman, North Lawrence, Ohio.

1,487,217. Mining-machine bit. James F. Dillon, Crown City, Ohio, assignor to Newton K. Bowman.

1,487,910. Drag-line-bucket cleaner. Ernest L. Bartmess, Pekin, Ill.

1,488,059. Scraper attachment. Nathaniel J. Pritchard, Santa Rosa, Cal.

1,488,066. Tunneling or mining machine. Alexander Schmidt, Dorog, Hungary.

1,488,290. Material-handling machine. Adolph W. Rybeck, Milwaukee, Wis., assignor to T. K. Smith Co., same place.

1,488,518. Mining machinery. William W. Robbins, Lorain, Ohio.

1,489,042. Excavating machine. Morton E. Pugh, Chicago, Ill.

1,489,583. Mining-machine. Edmund C. Morgan, Chicago, Ill.

1,489,600. Mining and loading machine. Joseph F. Joy, Pittsburgh, Pa., assignor to Jeffrey Mfg. Co., Columbus, Ohio.

1,490,074. Shaker-screen. George M. Stedman, Aurora, Ind., assignors to Stedman's Foundry & Machine Works, same place.

1,490,387. Excavating apparatus. Christian L. Hansen, Charles City, Iowa.

1,490,398. Mining apparatus. Edmund C. Morgan, New York, N. Y.

1,490,399. System of mining. Edmund C. Morgan, New York, N. Y.

1,477,530. Grab. Dudley J. Barnard, Barking, England.

1,477,539. Dipper. John O'F. Clark, Chicago Heights, Ill., assignor to American Manganese Steel Co., Chicago, Ill.

1,477,587. Crushing-machine. Augustus T. Perkins, Oak Park, Ill., assignor to Webster Mfg. Co., Chicago, Ill.

1,477,679. Dredging-bucket. Edward Woolley, Toronto, Canada.

1,477,684. Picking and rock-drilling machine. August Berner, Nuremburg, Germany.

1,477,749. Mine-drill. George Dobson, Sego, Utah.

1,477,848. Coal-breaker. Frank Pardee, Hazleton, Pa.

1,477,849. Spiral separator and method of separating materials. Frank Pardee, Hazleton, Pa., assignor to Anthracite Separator Co.

1,478,280. Coal cutting and loading machine. Francis K. Holmested, Charleston, W. Va.

1,478,281. Coal cutting and loading machine. Francis K. Holmested, Charleston, W. Va.

1,478,301. Bucket for steam shovels or the like. William C. Shea, San Anselmo, Cal.

1,479,322. Mine-car. Hugh W. Sanford, Knoxville, Tenn.

1,479,540. Pulverizer. Paul A. Hirsch, Erie, Pa., assignor to Furnace Engineering Co., New York, N. Y.

1,479,541. Pulverizer. Paul A. Hirsch, Erie, Pa., assignor to Furnace Engineering Co., New York, N. Y.

1,479,806. Excavating apparatus. Christian L. Hansen and Edward H. Peer, Charles City, Iowa; said Peer assignor to said Hansen.

1,749,834. Screening apparatus. Morley P. Reynolds, Cleveland Heights, Ohio, assignor to W. S. Tyler Co., Cleveland, Ohio.

1,479,849. Steam shovel. Warren D. Williams, Erie, Pa.

1,479,904. Compound gyratory screening device. Henry W. Falker, Ashland, Pa.

1,480,003. Machine for mining. Edmund C. Morgan, Chicago, Ill.

1,480,733. System and apparatus for mining coal. Edmund C. Morgan, New York, N. Y.

1,480,767. Pulverizer. Otto A. Kreutzberg, Lake Bluff, Ill.

1,481,211. Mechanical shovel. Vernon L. Keech and Emil A. Hurtley, Duluth, Minn., assignors to Robert S. Walker, Cleveland, Ohio.

1,481,234. Digging apparatus. Augustus Smith, Roselle, N. J., assignor to Bergen Point Iron Works, Bayonne, N. J.

Clay Products Affiliates With National Industrial Conference

Announcement is made that at the annual meeting of the National Industrial Conference Board in New York this month the affiliation of the National Clay Products Industries Association will be reported. At the same time the names of the delegates appointed by this association to serve on the Board and to act with it in its extensive industrial research work will be announced.

The National Clay Products Industries Association was organized three years ago and now has more than 100 manufacturers of building materials on its membership list, and this list will soon include practically all the leaders in the industry.

This association, by its affiliation with the National Conference Board, thus becomes an active participant in the work of the Board which is recognized as the most important industrial-economic research organization in all industry. More than 30 of the leading industrial associations of the country are affiliated with the board. The research reports and other economic data compiled and disseminated by the Board thus represent not only the ascertained facts as obtained by their research staff, but also the collective judgment of the business executives who comprise the Board's membership.

A New Sturtevant Screen

A new Skeleton type of Moto-Vibro Screen is announced by the Sturtevant Mill Company of Boston, Mass. This screen is built for heavy duty, to be placed over a bin or hopper. It is built primarily for sand and gravel, crushed rock, coal and similar substances to be screened wet, dry or damp, and has a range of output from 2 inches to 10 mesh or finer. The vibration is rapid and intense, and a 4 by 5 foot screen, they say, can handle a feed of over 50 tons per hour when putting through 25 tons of ¼ inch sand. It requires 2 HP to operate.

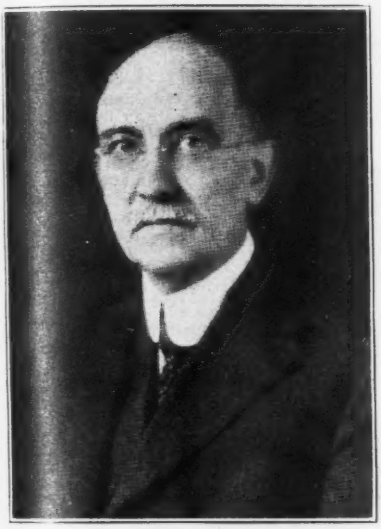
New Cement Bag Cleaner

A new cement bag cleaner has been put on the market by the Northern Conveyor & Mfg. Co. of Milwaukee, for which new improved features are claimed. The Northern Cleaner is 8-cornered and star-shaped, the 8 corners giving 8 complete drops to the bags to every revolution of the cage. It also imparts a variety of motions to the bags in addition to the tumbling motion. The shell is entirely dust proof and all gearing, machinery and power are accessible at all times. A saving of 50 per cent in freight on bags returned to the mills is claimed by the manufacturers.

Gibbons & Griffin Co., producers of sand and gravel, since May 1 have been located at Suite 1435, Burnham Building, corner of Randolph and La Salle Streets. Their new plant at Carpenters, Ill., was put in operation May 10, 1924.

Former Head Caldwell & Co. Dies

Frank C. Caldwell, a director of the Link-Belt Co., died of heart failure on May 15. Born in 1866, Mr. Caldwell was vice-president



Frank C. Caldwell.

and president of H. W. Caldwell Co. from 1892 until 1921, when that company was purchased by the Link-Belt Co. He was a director of Link-Belt until he died.

"Anchor" Car Replacers

The attention of quarry operators is called to the "Anchor" care replacer, recently developed by the T. H. Edelblute Co., Wabash Bldg., Pittsburgh. With this replacer a locomotive or entire train of cars, they say, can easily be re-railed in a few minutes. They are used in pairs. Light and small and easily handled and attached by one man, the "Anchor" replacers, made of cast steel, straddle the rail so as to positively guide the wheel back on the track, from either side.

Locomotive Crane The Industrial

Industrial Works of Bay City, Mich., announces a special high power INDUSTRIAL locomotive crane for use in wrecking and general quarry service. This machine is equipped with an adjustable boom for use in lengths of 50, 70 and 90 ft., with capacity of 75 tons with a 50 ft. boom at a 20 ft. radius and 40 tons with a 90 ft. boom at a 30 ft. radius. It is especially designed to handle a two-yard high powered clamshell bucket in rock and coal.

New Dodge Motor Pulley

Announcement is made by the Dodge Manufacturing Corporation of Mishawaka, Indiana, of their new Iron Center Wood Rim Motor Pulley. This embodies the principle of the Dodge Wood Split Pulley, and is a development of the Dodge idea of compression fastening and interchangeability of bushing to shaft. The hub construction is simple. There are two principal parts, the slit iron hub and the wood rim. The hub comprises a slit bushing, 2 wedge rings and 3 or more fillister head machine screws. The wood rim is of select stock, laid up in segments and glued under heavy pressure. A seamless steel tube is forced into the wood rim and securely interlocked. The pulley is easily applied and securely fastened and as easily removed with a screw driver.

Ouey! My Mack!

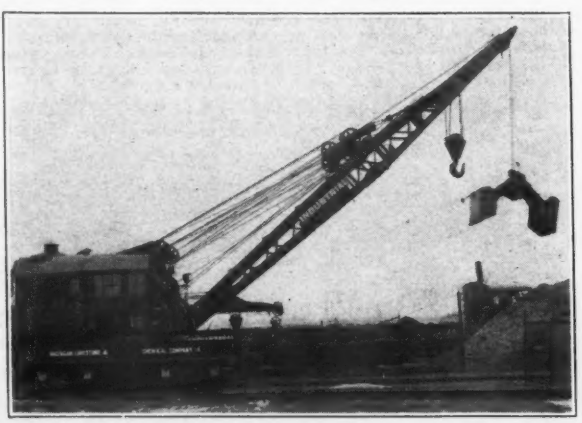
Mine business! Ouey! Exbenses high,
Vos yust about to choke und die.
In six years after since dot time,
Mine bank accound, she grow up fine,
Dot Mack, she iss some tam fine truck;
I buy her und I am in luck,
I load her up right by my door
Undil she vill nod hold some more;
I grank 'er up, trow in der clutch,
Und did she stall? I guess not much.
Right now dot truck runs effery day,
She runs right on und pays 'er vay.
You vants der druck what makes der mon?
Yust buy a Mack und vatch 'er run.

—*The Mack Bulldog.*

McMyler No. 2 Shovel

The new No. 2 McMyler-Interstate steam shovel, described in Bulletin 61 just issued by The McMyler-Interstate Company of Bedford, O., is a machine of ¾ yard capacity, described as readily convertible from steam shovel to locomotive crane. It is equipped with either crawler treads or tractor wheels.

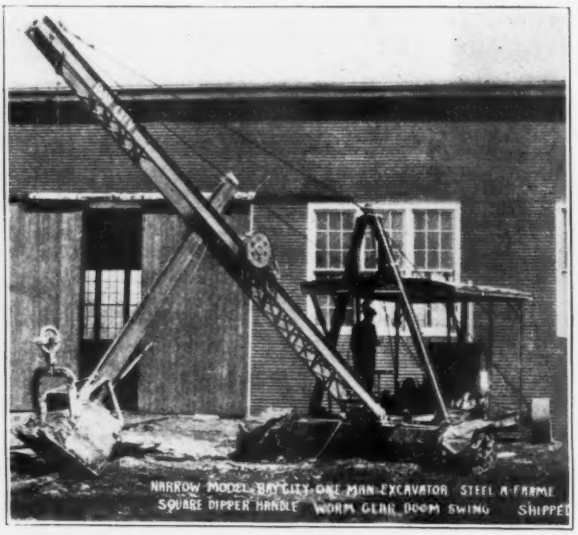
"In contrast to present types of steam shovels," says the McMyler-Interstate Company, "this machine includes as standard equipment double power drums and a self-locking worm driven boom hoist. The change from shovel to crane can be made in the field without special equipment, in less than an hour. Three outstanding features of the No. 2 steam shovel are: Strength of construction—Accessibility—Convertibility."



Industrial Locomotive Crane.

New Bay City One-Man Excavator

The new model One-Man Excavator just announced by the Bay City Dredge Works, Bay City, Mich., is lighter in weight than the old model, more sturdily constructed and takes less room in the pit. Important changes are the Hercules, 4-cylinder Power Unit; replacement of Belt Drive by direct gear and Pinion Drive connection to motor; elimination of



New Bay City One-Man Excavator.

Swing Drum, Swing Cable and A-Frame Crossbar by a worm gear slewing arrangement at bottom of boom. The mast is eliminated in front of operator; larger rear wheels are used; a square Dipper Handle is substituted for round; a steel front A-Frame instead of wood frame, riveted instead of bolted; and the roof also is of steel instead of wood.

The North Shore Cement Products Co., Inc., of Huntington, N. Y., was recently incorporated for $5,000. Directors are Roland Van Waldburg, Martin F. Brockmann and John B. Durand, Huntington.

Climax Engineering Company

In days long gone by the Climax Engineering Company, of Clinton, Iowa, manufacturers of industrial engines, then known as the Lamb Boat & Engine Company, was one of the largest manufacturers of marine engines. On the death of James Dwight Lamb the company was reorganized as the "Climax Engineering Co.," and engaged in the manufacture of gasoline engines for tractor and general power purposes.

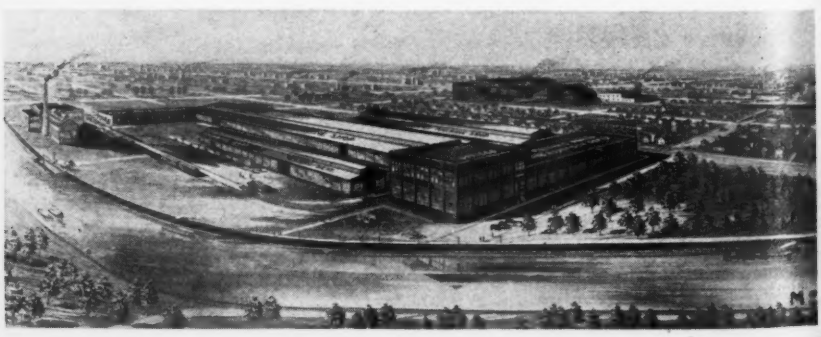
Today industrial applications of Climax engines predominate in its field of manufacture, and these engines are said to be used as standard equipment by a majority of the manufacturers of contractors' and industrial machinery.

The Climax line of "Trustworthy" engines consists of two models of four-cylinder engines. To supplement its line of gasoline engines it is also developing a line of crude oil engines of the true Diesel type, of from 50 to 400 H.P.

The company's equipment comprises complete machine shops, foundry, stock warehouses, assembling and general office buildings, etc. The main plant covers one city block. The company manufactures all parts of its engines excepting the carburetors and electrical equipment, and maintains repair parts stations at Chicago, Cincinnati, Dallas, Denver, Los Angeles, Kansas City, Minneapolis, New York City, Oklahoma City, Pittsburg, St. Louis, San Francisco and Seattle.

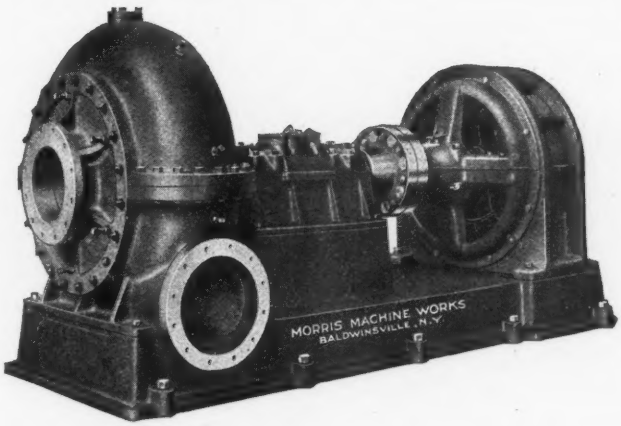
Bucyrus Promotions

The following promotions were announced on May 8, 1924, by the Bucyrus Company of South Milwaukee: G. A. Morison, secretary and sales manager, appointed to second vice-president in charge of sales, in addition to his title of secretary; D. P. Eells, treasurer and manager of foreign and export department in addition to treasurer; Wm. Bager, chief engineer, appointed second vice-president in charge of engineering.



Plant of the Climax Engineering Co., Clinton, Iowa.

Profits from sand and gravel
demand the right handling methods



More high-quality sand and gravel for building purposes are produced and handled by hydraulic methods than by all others put together. Why?—Low cost, convenience, clean product and perfect segregation of sizes.

If you want the reputation for a strictly clean well graded product and want to produce at a cost meeting any competition on at least equal terms, get a Morris Pump and free suggestions from our engineers as to how it should be used.

Morris Sand and Gravel Pumps are universally conceded to be very economical of power (steam, electric, or gas-engine), to stand hard knocks without serious wear, and to go right on delivering year after year at high efficiency, and with very little maintenance expense.

Tell us about your present production methods and costs, and if Morris Pumps would better your conditions, our engineers will tell you without charge, how much, why and at what installation and maintenance costs.

Write for our Bulletin 20, "Sand and Dredging Pumps"

Morris Machine Works, Baldwinsville, N. Y.

Originators of Centrifugal pumps, both single and multi-stage, and builders for practically all purposes since 1864.

Branch Offices: New York, 39-41 Cortlandt St., Philadelphia, Forest Bldg., Cleveland, Engineers' Bldg., Chicago, 217 No. Jefferson St., Boston, 79 Milk St., Pittsburgh, 320 Second Ave., Detroit, Penobscot Bldg., Charlotte, Realty Bldg., Houston 119 Main St.

Sales Representatives: Buffalo, St. Paul, Kansas City, Denver, Salt Lake City, Seattle, Portland, Ore., Los Angeles, New Orleans. **Canadian Representatives:** Storey Pump & Equipment Co., Toronto.

MORRIS
CENTRIFUGAL PUMPS

The Waughoist Model 250

An interesting tale of the development of hoists from primitive beginnings is contained in a booklet recently issued by The Denver Rock Drill Manufacturing Co. of Denver, Colo. All this was long before the Waughoist and other modern hoists were developed. The Waughoist, which is of about the same size and style as other hoists, is said to have some important new features. Chief among these is the engine.

The engine was designed as a rotary engine,

because of the generally recognized superiority of the rotary type over the reciprocating type, and because it will develop much more power and use less air than other types.

Other points of advantage are as follows: Vibration is said to be negligible at all speeds and loads. The splash system generally used in the lubrication of the automobile, in combination with a force feed to the main bearing, is employed in lubricating the Waughoist.

Much greater potential horsepower is claimed than the power named. All friction surfaces are ground to the precise size limit desired, instead of overlapping them. Featherweight piston rods are used and piston rings that prevent all leakages.

Link-Belt Sales School

The problem of training sales forces—always a long and expensive proposition—is to be met by the Link-Belt Co. by the holding of annual sales schools. The last was held at the Link-Belt Indianapolis factory May 5 to 8. Nineteen salesmen from Boston, Philadelphia, Toronto, Pittsburgh, Cleveland, Detroit, Chicago, Seattle and Indianapolis were present and were addressed by Alfred Kauffman, vice-president of Indianapolis work, and Julius I. Holl, advertising manager, and others.

An order for a gondola car dumper was recently given the Link-Belt Co. by the Columbus Railway, Power & Light Co. of Columbus, O. This is similar to the one erected for the Cahokia Station of the Union Electric Light & Power Co. of St. Louis.

Heat Transfer and High Temperature Insulation

During the past school year, a lecture on Heat Transfer and High Temperature Insulation prepared by the Engineering Department of the Celite Products Company, Chicago, was given before the various engineering classes at approximately fifty of the large universities throughout the country. The lecture is illustrated with 25 lantern slides, showing curves on conductivities of various materials, charts showing heat losses through various wall constructions in heated equipment, photographs of insulated equipment under construction, etc.

Printed copies of the lecture with the illustrations included are distributed among the students for their records and these printed copies are also available for general distribution to anyone interested in this subject. Schedule is now being arranged for delivery of the lecture during the 1924-25 school year.

Chicago Automatic Conveyors

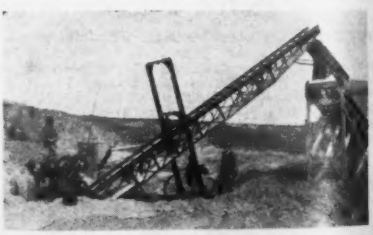
Chicago Automatic Conveyors, manufactured by the Chicago Automatic Conveyor Company of Chicago, which are described by users as being capable of handling over a yard of material per minute and once adopted prove indispensable, are built in varying types and sizes.

The Automatic Drag Type, made with open or closed receiving end, will handle all grades of material from the finest screenings to the largest lumps. Heavy iron drags 2½ inches high and 13 inches apart permit handling the largest lumps of material at an angle of 45 degrees.

The Automatic Belt Type handles every kind of material, such as sand, gravel, clay, sacked cement, lime fertilizer, salt, coal, coke, charcoal, etc. This machine has a 4-ply flat rubber belt 20 inches wide, running in a trough, with reinforced carrying surface and is equipped with steel angle-iron drags.

The Automatic Bucket Type is recommended for handling sand, gravel, screenings, and the finer grades of coal, ashes, etc. This type will operate in an almost vertical position or where space is limited, and can be furnished either on Wheel Frame or Trolley Rail. All three of these types are made in lengths of from 12 to 50 feet, for portable use, and in unlimited lengths for stationary use. As to power used, the manufacturers furnish either Gasoline Engine or Electric Motor.

The Electric Motor is mounted in the Con-



Chicago Automatic Conveyor.

veyor, being thoroughly protected and portable with the outfit, and can be had in either Two or Three Phase, Single Phase or D. C. The Gasoline Engine is mounted on an inclined platform over the top of the Conveyor Frame, entirely out of the way of grit, yet easily accessible. High grade construction, low price and low maintenance cost are some of the advantages secured in installing Chicago Automatic Conveyors, they say.